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MICROWAVE CAVITY LABORATORIES

Model
10358

HANDBOOK

38A1109

FEBRUARY 1971

MICROWAVE CAVITY LABORATORIES
DIVISION OF KMS INDUSTRIES INC.

OPERATION AND MAINTENANCE MANUAL

MODEL 10358
RF POWER AMPLIFIER

FEBRUARY 1971

THIS MANUAL APPLIES DIRECTLY TO MCL
MODEL 10358 RF POWER AMPLIFIERS
HAVING SERIAL NUMBERS 1001 TO 1019

Model
10358

HANDBOOK
38A1109
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1.0 INTRODUCTION

1-1. This manual is a complete operation manual for the Microwave Cavity Laboratories Model 10358 RF Power Amplifier and the Model 10358, Model 10363, Model 10364 and Model 10365 Plug-in Modules. The Model 10358 RF Power Amplifier is packaged in a Relay Rack Housing which, in turn, is mounted in a U.S. Army Missile Command Container Assembly 7921089-17. The Plug-in Modules are packaged in a Microwave Cavity Laboratories Model 10362 Relay Rack Housing which, in turn, is mounted in a U. S. Army Missile Command Container 7921089-17 along with a Microwave Cavity Laboratories Model 10366 Storage Drawer. Figure 1-1 is an overall view of the Model 10358 RF Power Amplifier and associated Plug-in Modules mounted in the AMC container. In the following paragraphs, the individual sub units are described in detail.

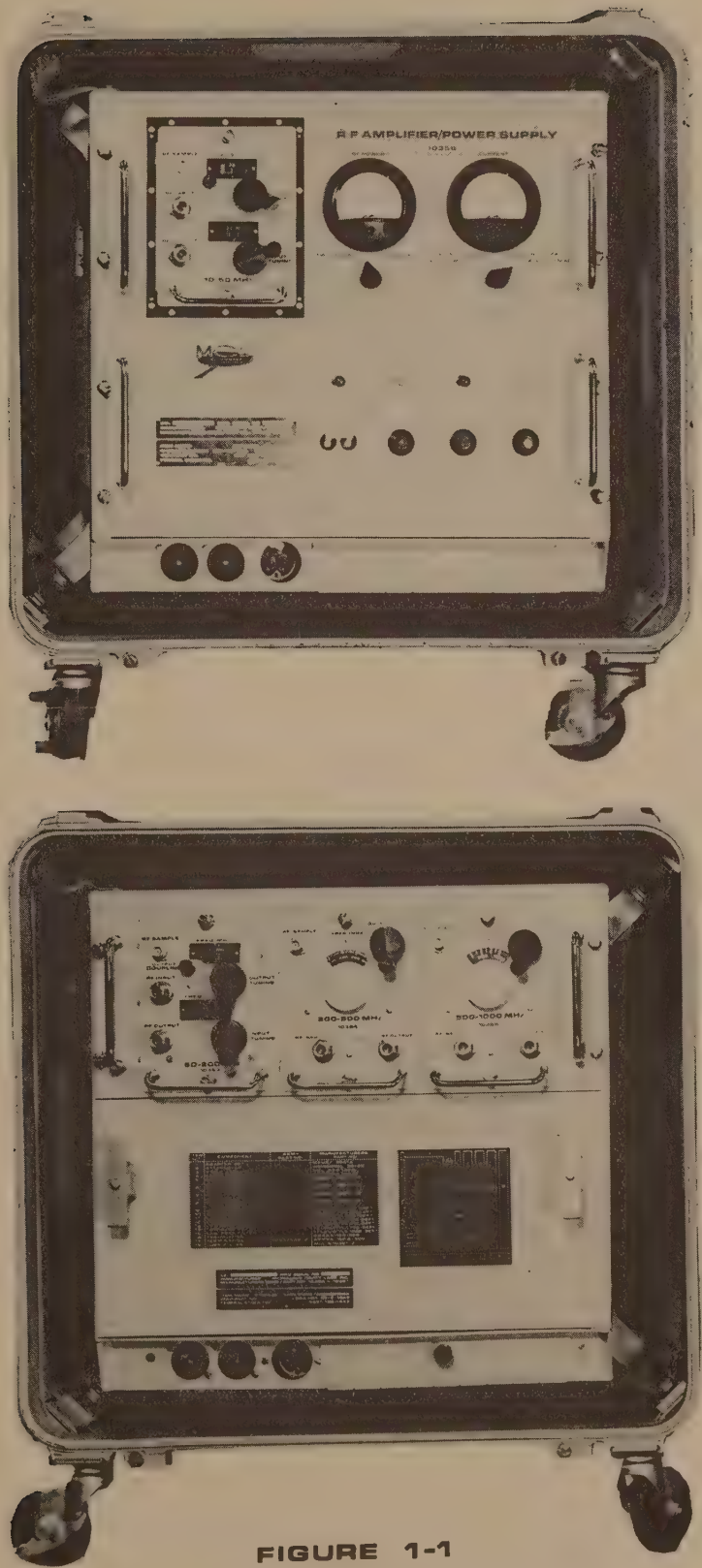

R F AMPLIFIER/POWER SUPPLY
10358
10-50 MHz
200-500 MHz
500-1000 MHz

FIGURE 1-1

2.0 EQUIPMENT DESCRIPTION

2-1. PURPOSE

2-2. The Microwave Cavity Laboratories Model 10358 RF Power Amplifier, when used with the Plug-in Modules listed herein, is a VHF-UHF system capable of delivering 200 watts CW in the frequency range of 10 MHz to 500 MHz and 100 watts CW in the frequency range of 500 MHZ to 1000 MHz. The frequency spectrum can be covered utilizing four easily installed Plug-in Modules. The basic Model 10358 RF Amplifier/Power Supply rack supplies all the necessary operating functions to the Plug-in Modules - only an external RF drive source and primary power are required for complete system operation.

2-3 GENERAL DESCRIPTION

2-4. The basic Model 10358 RF Amplifier/Power Supply rack accepts one Plug-in Module, additional storage for the Plug-in Modules is provided by the MCL Model 10362 Relay Rack Housing. To provide additional storage space for auxiliary items, the MCL Model 10356 Storage Drawer is included.

2-5. The Microwave Cavity Laboratories Model 10358 RF Power Amplifier is housed in a metal cabinet enclosed on all sides. The front panel supplied allows the unit to be mounted in a standard 19 inch wide relay rack. All contacts and external connectors are mounted on the front panel. All Plug-in Modules contain frequency readout devices, tuning controls, RF input and RF output connectors and auxiliary output sampling port. A front panel relative power meter has been provided with two scales, 250 watts for forward output power and 25 watts for reflected power, scale selection is controlled from a front panel switch. A three scale current meter is provided on the front panel to monitor the grid current, screen current and plate current - the current meter monitoring circuits are selected by a front panel switch.

2.6. SPECIFICATIONS

2.7. Table 2-1 lists the specifications for the Model 10358 RF Power Amplifier.

TABLE 2-1. MODEL 10358 SPECIFICATIONS

PLUG-IN MODULE	FREQUENCY RANGE	POWER OUTPUT
Model 10359	10 MHz to 50 MHz	200 Watts Min.
Model 10363	50 MHz to 200 MHz	200 Watts Min.
Model 10364	200 MHz to 500 MHz	200 Watts Min.
Model 10365	500 MHz to 1000 MHz	100 Watts Min.

Size: 19 inches wide, 15½ inches high, 21¼ inches deep

Weight: Less than 143 pounds

Input Power: 115 VAC ± 10%, 50-60 Hz, 800 Watts Nominal

Frequency: Calibration - Direct Reading:

±20% 10 MHz to 200 MHz
±10% 200 MHz to 1000 MHz

Tuning - 10 MHz to 200 MHz Input and Output

200 MHz to 1000 MHz Single Control

Power: Stability - ±0.2db per Hour after 2 Hours stabilization at a constant power and frequency.

Metering - Front Panel Meter reads forward power on 250 Watt Scale, and reflected power on 25 Watt Scale.

RF Sample - 10 MHz to 50 MHz 43db ± 3db below main output.

50 MHz to 1000 MHz 33db ± 3db below main output.

3.0 GENERAL THEORY OF OPERATION

3.1. PLUG-IN RF AMPLIFIER MODULES

3.2. Model 10359 Plug-in RF Amplifier Module.

The Model 10359 Plug-in RF Amplifier Module employs a 8226 Tetrode tube in a self-biased grounded grid configuration operating as a Class B Amplifier (See Figure 3-1). The unit is capable of 200 watts CW minimum RF power output operating in the frequency range of 10MHz to 50MHz. The input and output circuits are individually tuned to provide maximum selectivity. The input is a tuned circuit with the line inductance tuned to resonance with the tube input capacitance plus terminating capacitance. The output is also a tuned circuit with the anode line inductance tuned to resonance with the tube output capacitance.

R.F. Power output is coupled out by the use of an adjustable capacitive probe to insure optimum coupling over the specified frequency range.

3-3. Model 10363 Plug-in RF Amplifier Module.

The model 10363 Plug-in RF Amplifier Module employs a 8226 Tetrode tube in a self-biased grounded grid configuration operating as a Class B Amplifier (See Figure 3-2). The unit is capable of 200 watt CW minimum RF power output operating in the frequency range of 50MHz to 200MHz. The input circuit consists of a modified strip line resonated with the tube input capacitance and added distributed capacitance. The output is a tuned circuit with the anode line inductance tuned to resonance with the output capacitance of the tube. The input and output circuits are individually tuned to provide maximum selectivity. RF Power output is coupled out by the use of an adjustable capacitive probe to insure optimum coupling over the specified frequency range.

3-4. Model 10364 Plug-in RF Amplifier Module.

The Model 10364 Plug-in RF Amplifier Module employs a 8226 Tetrode tube in a self-biased grounded grid configuration operating as a Class B Amplifier (See Figure 3-3). The unit is capable of 200 watts CW minimum RF power output operating in the frequency range of 200MHz to 500MHz. A single control tuning is achieved with this RF Plug-in Amplifier Module for simultaneous tuning of the input and output liner throughout the specified tuning range. The input and output circuits both consist of coaxial lines resonated with the tube input and output capacitance. RF Power output is coupled out through the use of a carefully designed preset capacitive probe.

MODEL 10359 PLUG-IN MODULE (10 MHz - 50 MHz)

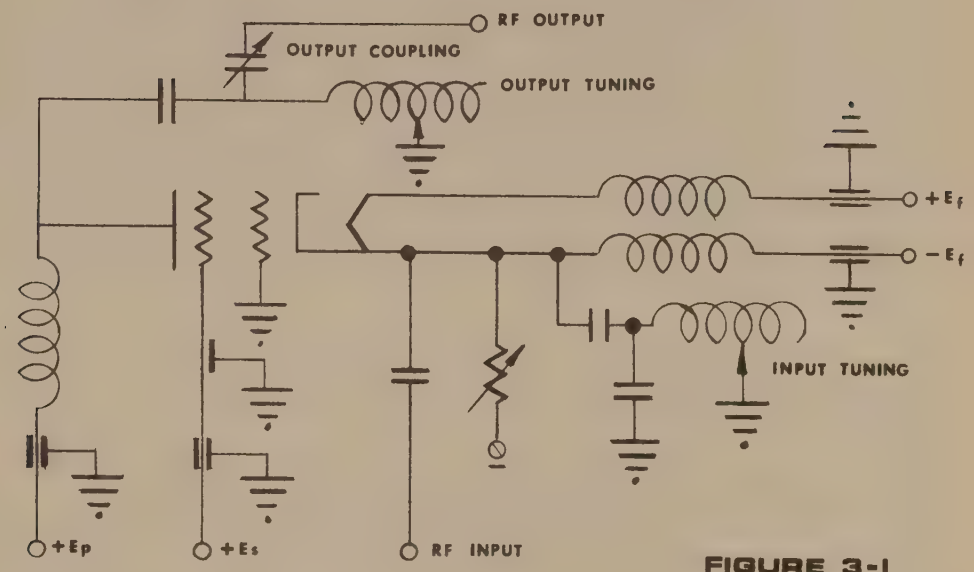


FIGURE 3-1

MODEL 10363 PLUG-IN MODULE (50 MHz - 200 MHz)

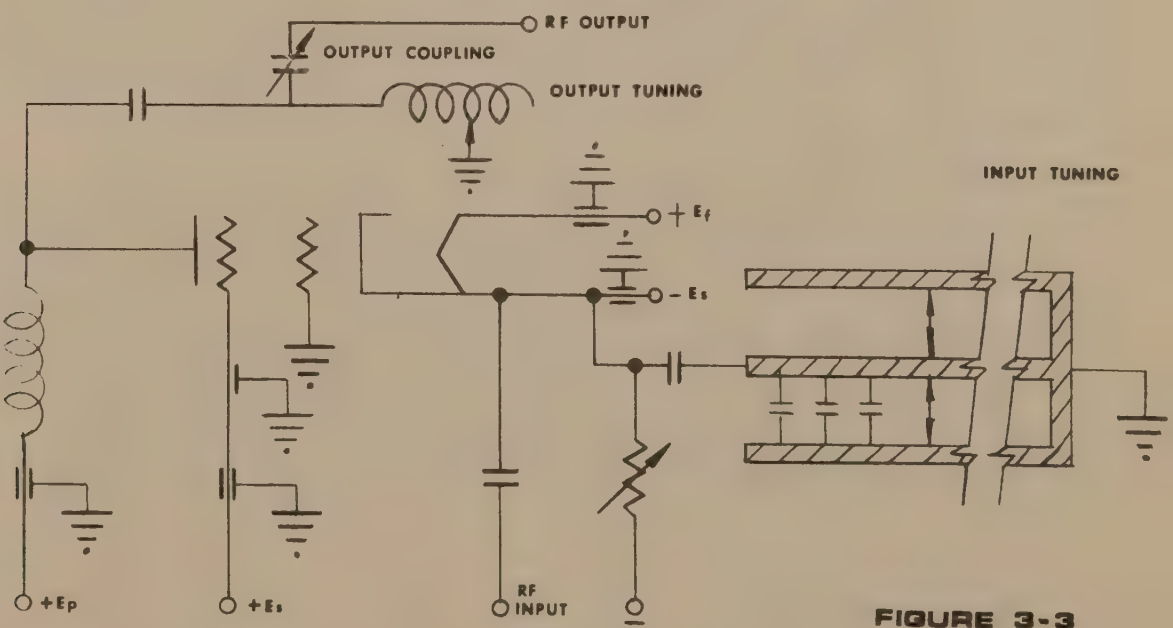


FIGURE 3-3

3-5. Model 10365 Plug-in R.F. Amplifier Module

The Model 10365 Plug-in RF Amplifier Module employs a 8403 Planar Triode tube in a self-biased grounded grid configuration operating as a Class B Amplifier (See Figure 3-4). The unit is capable of 100 Watts CW minimum RF power output operating in the frequency range of 500 MHz to 1000 MHz. A single control tuning is achieved with this Plug-in RF Amplifier Module for simultaneous tuning of the input and output lines throughout the specified tuning range. The input and output circuits both consist of coaxial lines resonated with the tube input and output capacitance. RF power output is coupled out through the use of a carefully designed preset capacitive probe.

MODEL 10364 PLUG-IN MODULE (200 MHz - 500 MHz)

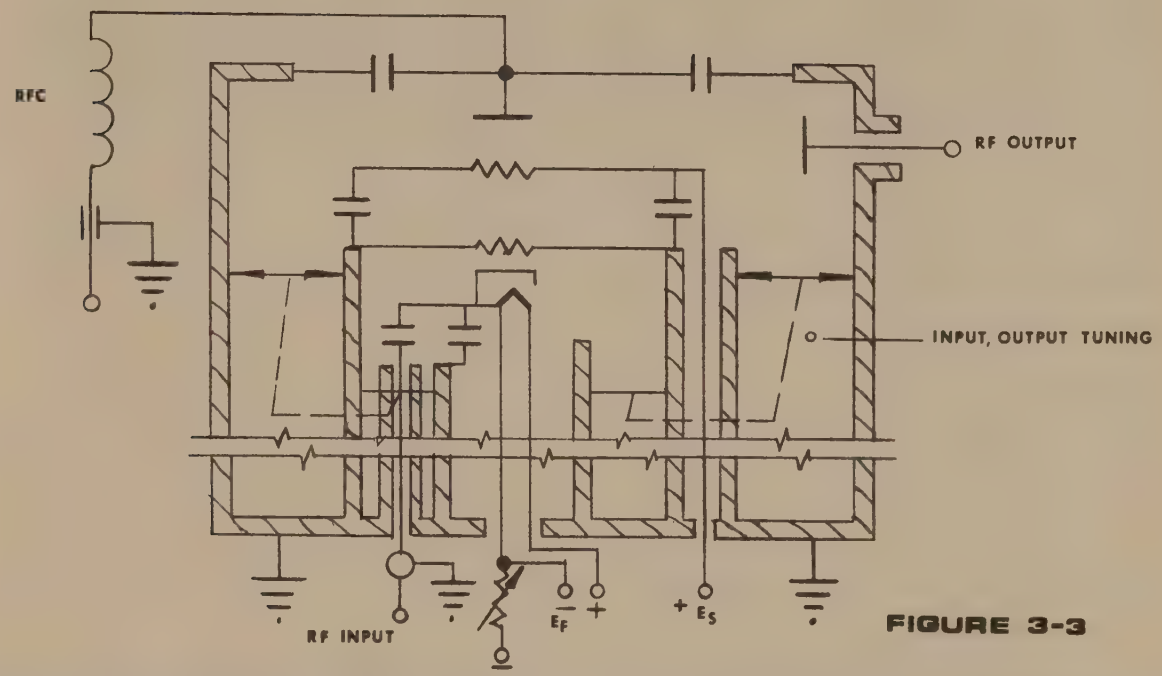


FIGURE 3-3

MODEL 10365 PLUG-IN MODULE (500 MHz - 1000 MHz)

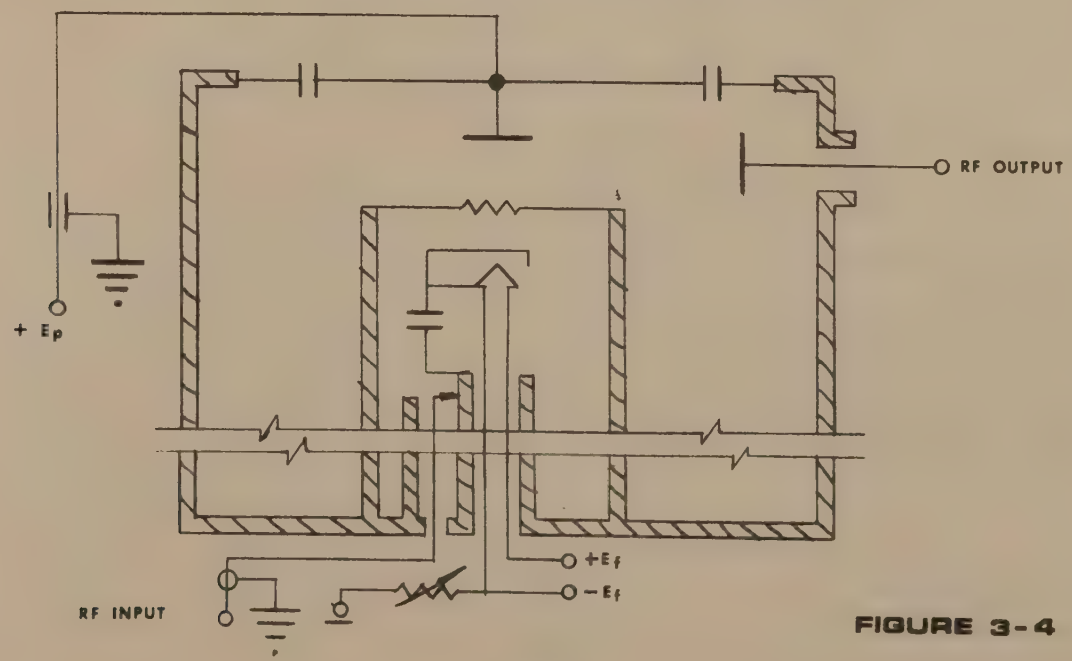


FIGURE 3-4

4.0 CIRCUIT DESCRIPTION

4.1. All circuitry employed in the Microwave Cavity Laboratories Model 10358 RF Power Amplifier is contained within the MCL Model 10358 RF Amplifier/Power Supply Drawer. Only the circuitry directly involved with the RF Power Amplifier cavities is inside the Plug-in Modules - this simplifies maintenance and trouble-shooting. The following description is presented in block form and describes major sub systems - see Figure 4-1. The location of the electrical components by reference symbols can be found by checking the schematic drawings in the Appendix.

4-2. POWER SUPPLIES

4.3. FILAMENT SUPPLY
Solid state regulated DC power supply with output voltage adjustable from 5VDC minimum to 7VDC maximum. Filament voltage is monitored at test points TP105 and TP106. The voltage level is determined by the setting of R107 and is set at +6.3VDC.

4.4. SCREEN SUPPLY
Solid state regulated DC power supply with output voltage adjustable from 225VDC to 250VDC. The screen voltage is monitored at test points TP103 and TP104. The voltage level is determined by the setting of R106 and is set at +250VDC.

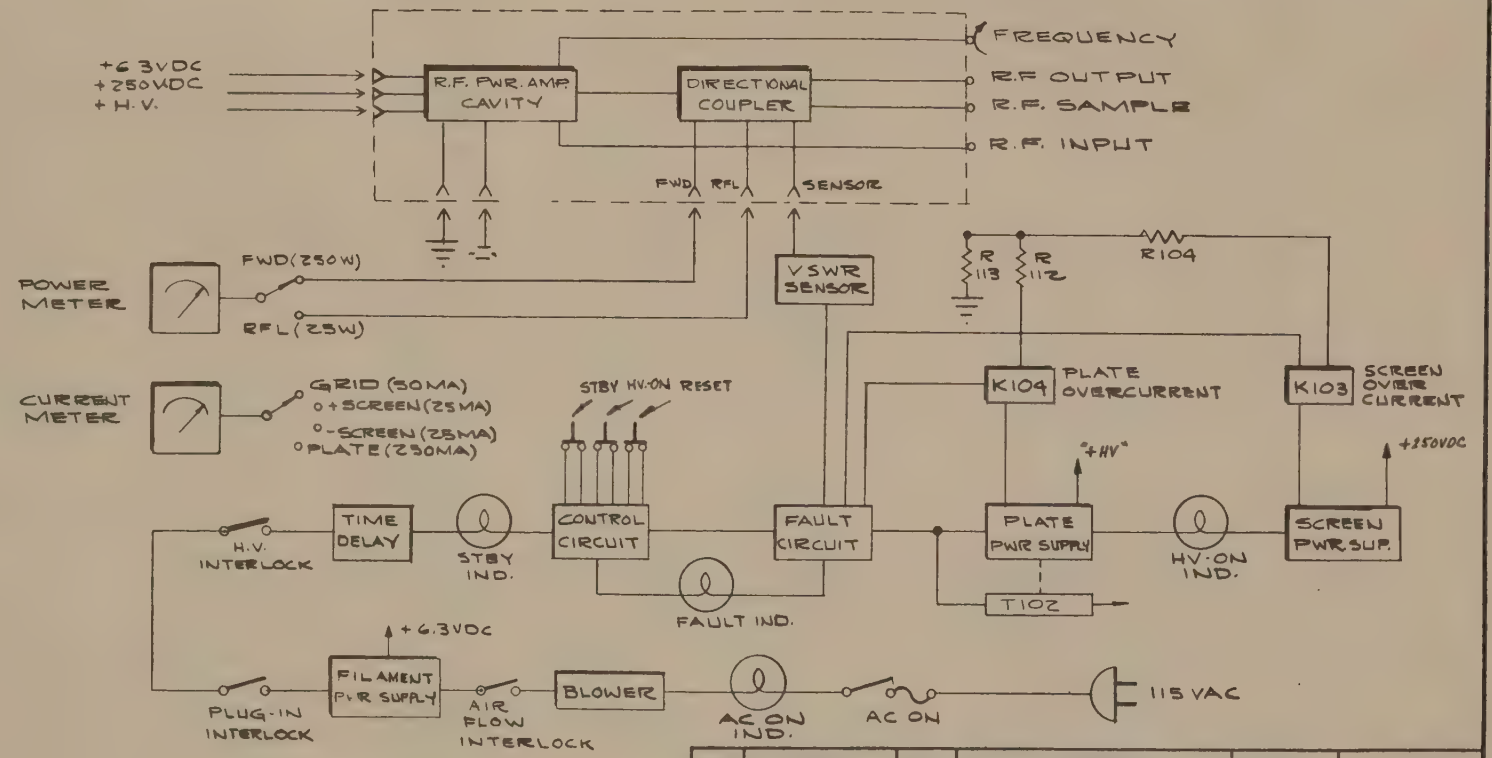
4.5. ANODE SUPPLY
Solid state unregulated DC power supply with a full wave bridge, pye type LC filter configuration with a fixed DC output voltage. TP101 and TP102 provide a reduced voltage proportional to the anode supply output. A reading of approximately 100VDC is an indication of satisfactory operation of the anode supply.

4.6. COOLING
Forced air cooling is provided by a blower mounted within the MCL Model 10358 RF Amplifier/Power supply drawer. An air duct is provided to mate with the plug-in RF Amplifier modules. Cooling is provided only to the anode section of the plug-in modules.

4.7. MONITORING CIRCUITS

4.8. OUTPUT POWER
A single front panel meter is provided to indicate forward or reflected power and is controlled by switch S104 to change the function of the meter. With switch S104 in the "Forward" position, the meter will indicate forward power to 250 watts full scale. With switch S104 in the "Reflected" position, the meter will indicate reflected power to 25 watts full scale.

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVAL
A	ORIGINAL		7-28-70



ITEM	PART NO.	QTY.	DESCRIPTION	MAT'L.	MAT'L. SPEC.

LIST OF MATERIAL

DO NOT SCALE:

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES

TOLERANCES FRACTIONAL ± 1/64
DECIMAL ± .005
ANGULAR ± 1°

MATERIAL:

SPEC:

FINISH:

SPEC.

	DRAWN	7/27/70
	CHECKER	
	MECH. ENGR.	
	ELEC. ENGR.	
	PROJ. ENGR.	
	CHIEF ENGR.	

NEXT ASS'Y	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY. REQ'D.	

FIG. 4-1
R.F. POWER AMPL.
FUNCTIONAL BLOCK
DIAGRAM
MODEL 10358

MCL MICROWAVE CAVITY LABORATORIES
LAGRANGE, ILLINOIS

4-2

SCALE: WEIGHT ACT. CALC. SHEET OF

4.9. CURRENT METER
A single front panel meter is provided to indicate anode, screen and grid current. The function of the meter is controlled through switch S105. With switch S105 in the grid position, the meter will indicate current to 50MA full scale. With switch S105 in the screen position, (plus or minus) the meter will indicate current to 25MA full scale. With switch S105 in the anode position, the meter will indicate current to 250MA full scale.

4.10. PROTECTIVE CIRCUITRY

4.11. INTERLOCKS
Two safety interlocks are provided, switches S106 and S107. Switch S106 functions are a safety interlock on the top cover panel to de-energize the high voltage power supply and return the RF Amplifier to the AC ON mode of operation in the event operation is attempted with the top cover removed. Switch S107 functions as a safety interlock for the plug-in RF Amplifier module and prevents the RF amplifier from being energized from the AC ON mode until the plug-in RF Amplfier module is fully engaged.

4.12. AIR FLOW SWITCH
Switch S108 is provided as an air flow safety switch to protect the RF Amplifier in the event the air supply to the plug-in RF Amplifier modules is cut off. With the air flow switch S108 de-energized the RF Amplifier will remain in the AC ON mode.

4.13. TIME DELAY RELAY
Relay K101 is provided as a two minute time delay relay to insure a sufficient warm-up period for the filaments of the plug-in RF Amplifier module prior to the application of the anode voltage. The MCL Model 10358 RF Power Amplifier will not cycle to the "STANDBY" mode until the time delay cycle is completed.

4.14. ANODE OVERCURRENT PROTECTION
Relay K104 is provided to protect the MCL Model 10358 RF Power Amplifier from excessive anode current. Relay K104 is adjusted by R102 to energize when anode current in excess of 250MA is drawn; when the relay K104 is activated, the RF Power Amplifier will cycle to the "FAULT" mode.

4.15. SCREEN OVERCURRENT PROTECTION
Relay K103 is provided to protect the MCL MOdel 10358 RF Power Amplifier from excessive screen current. Relay K103 is adjusted by R110 to energize when screen current in excess of 25MA is drawn; when the relay K103 is activated, the RF Power Amplifier will cycle to the "FAULT" mode.

4.16. VSWR PROTECTION CIRCUIT

The MCL Model 41B1025A VSWR protection circuit provides protection for the MCL Model 10358 R.F. Power Amplifier when reflected output power is in excess of 25 watts. The circuit MCL 41B1025A provides R115 and R116 for sensing level adjustments. (See paragraph 7-26). R115 can vary the VSWR protection level. It is set to energize K108 when reflected power is in excess of 25 watts.

4.17. TRANSFORMER T102

Transformer T102 is switched into the circuit through jack J103 and plug P601 when the Model 10365 Plug-in Module (500-1000 MHz) is inserted. Transformer T102 provides a backing voltage to the primary of PS101 to reduce the applied plate voltage.

4.18. MODEL 10365 OVERCURRENT PROTECTION

Overcurrent protection is provided for the MCL Model 10365 Plug-in Module by the network consisting of Q601, Q602, R602, R603, R604, R605 and RT601. As current increases through RT201, R604 and R605, Q602 is biased on. As Q602 is biased on it in turn causes Q601 to be biased off thereby limiting the current to the plug-in module.

4.19. PLUG-IN MODULES

The plug-in modules are described in Section 3.0 General Theory of Operation and figures 3-1, 3-2, 3-3 and 3-4.

5.0 OPERATION

5-1. OPERATING CONTROLS

5-2. All operating controls for the Model 10358 RF Power Amplifier are located on the front panel.

5-3. Preliminary Adjustments

Prior to operating the Model 10358 RF Power Amplifier, the following steps should be observed:

1. Switch the AC "ON-OF" switch to the "OFF" position.

2. Connect the primary power input cable into a source 105 to 125 volts, 50 to 60 Hz power.

3. Install and secure the desired RF Plug-in Module.

CAUTION

The AC "ON-OFF" Switch should be in the "OFF" position whenever installing or removing RF Plug-in Modules.

4. Connect the "RF OUTPUT" jack to the equipment under test (or a 50 ohm coaxial load rated at 300 watts).

5. Set the "RF POWER" switch to the "FWD (250W)" position.

6. Set the "CURRENT" switch to the "PLATE (250MA)" position.

7. Connect the "RF SAMPLE" jack to desired test equipment (or a 50 ohm coaxial load rated at 1 watt).

5-4. OPERATING PROCEDURE

5-4-1. Model 10359 & 10363 Plug-in Modules.

1. Place the AC "ON-OFF" switch in the "ON" position and note that the "AC-ON" indicator lamp (AMBER) is activated.

2. Upon completion of the time delay cycle (120 seconds) the RF Power Amplifier will cycle to the "STANDBY" mode. Note that the "STANDBY" indicator light (CLEAR) is activated.

3. Turn the high voltage on by depressing the "HV-ON" Switch and note that the "STANDBY" indicator light "CLEAR" is deactivated and the "HV-ON" indicator light (RED) is activated.

4. Monitor the "CURRENT" meter for indication of quiescent current ("CURRENT" meter switch in the "PLATE" (250MA) position) - 50 to 60 MA nominal. The Model 10358 RF Power Amplifier is now ready for operation.

5. Apply RF drive (approximately 10 watts) from the RF Power generator to the "RF INPUT" jack of the Plug-in Module.

6. Monitor the frequency and power input from the RF Power Generator to the RF Power amplifier.

7. Adjust the "INPUT" and "OUTPUT" tuning controls to the approximate frequency as indicated by the "INPUT" and "OUTPUT" frequency readout devices. "ROTATE COUPLING" control maximum counter clockwise (minimum output coupling).

8. Adjust the "INPUT" tuning control for minimum reflected input power as indicated on the RF generator reflected power meter (or desired test equipment).

9. Adjust the "OUTPUT" tuning control for a peak in the power output as indicated on the "RF POWER" meter with the "RF POWER" meter switch in the "FWD (250W)" position.

10. Monitor the screen current on the "CURRENT" meter with the "CURRENT" meter switch in the "+ SCREEN (25MA)" position or "- SCREEN (25MA)" position - as required for upscale indication on current meter.

11. Adjust "COUPLING" for a screen current reading of approximately 1 or 2 MA as indicated on the "CURRENT" meter with the "CURRENT" meter switch in the "+ SCREEN (25MA)" position.

    NOTE: Low frequency ends of the head range require almost maximum coupling (turn output coupling control clockwise to increase coupling), high frequency ends of the head range require reduced coupling (turn output coupling control counter-clockwise to decrease coupling).

12. Readjust the "OUTPUT TUNING" control for maximum power output as indicated on the "RF POWER" meter with the "RF POWER" meter switch in the "FWD (250W)" position.

13. Increase RF drive (not to exceed 30 watts) from the RF Power Generator to the RF Power Amplifier.

14. Repeat steps 11, 12 and 13 until the desired RF Power output level is indicated on the "RF POWER" meter with the "RF POWER" meter switch in the "FWD (250W)" position. Note that optimum coupling occurs when the screen current indicates plus 1 or 2 MA. Repeat Step 8.

CAUTION

Misadjustment of the output coupling control can cause screen current in excess of 25MA - should this occur, the RF Power Amplifier will cycle to the "FAULT" mode due to the screen overcurrent protection relay.

When the RF Power Amplifier cycles to the "FAULT" mode due to misadjustment of the output coupling, the following procedure should be followed:

1. Remove the RF drive to the RF Power Amplifier. "Rotate coupling" slightly Counter-clockwise.

2. Depress the "RESET" switch and note that the "FAULT" indicator lamp (WHITE) will deactivate and the "STANDBY" indicator light (CLEAR) will activate.

3. Depress the "HV-ON" switch and note that the "STANDBY" indicator light (CLEAR) will deactivate and the "HV-ON" indicator lamp (RED) will activate.

4. Monitor the "CURRENT" meter for indication of quiescent current ("CURRENT" meter switch in the "PLATE (250MA)" position) - 50 to 60 MA nominal. The Model 10358 RF Power Amplifier is now ready to be retuned.

5.4.2 Model 10364 & 10365 Plug-in Modules.

1. Place the AC "ON-OFF" switch on the "ON" position and note that the "AC-ON" indicator lamp (AMBER) is activated.

2. Upon completion of the time delay cycle (120 seconds) the RF Power Amplifier will cycle to the "STANDBY" mode and note that the "STANDBY" indicator light "CLEAR" is activated.

3. Turn the high voltage on by depressing the "HV-ON" switch and note that the "STANDBY" indicator light (CLEAR) will deactivate and the "HV-ON" indicator lamp (RED) will activate.

4. Monitor the "CURRENT" meter for indication of quiescent current ("CURRENT" meter switch in the "PLATE (250MA)" position) - 50 to 60 MA nominal for the 10364 Plug-in Module and 75 to 85 nominal for the 10365 Plug-in Module. The Model 10358 RF Power Amplifier is now ready for operation.

5. Apply RF drive (approximately 10 watts) from the RF Power Generator to the "RF INPUT" jack of the Plug-in Module.

6. Monitor the frequency and power input from the RF Power Generator to the RF Power Amplifier.

7. Adjust the "OUTPUT TUNING" control to the approximate frequency as indicated by the "OUTPUT" frequency readout device.

8. Adjust the "OUTPUT TUNING" control for maximum RF power output as indicated by the "RF POWER" meter with the "RF POWER" meter switch in the "FWD (250W)" position.

9. Increase RF drive (not to exceed 30 watts) from the RF power generator to the RF Power Amplifier.

10. Repeat step 8 until the desired RF power output level is indicated on the "RF POWER" meter with the "RF POWER" meter switch in the "FWD (250W)" position.

RF SAMPLE
FREQ. MH
20 25
OUTPUT
INCR
RF INPUT
OUTPUT
TUNING
FREQ. MH
20 25
RF OUTPUT
INPUT
TUNING
10359

FIGURE 5-1

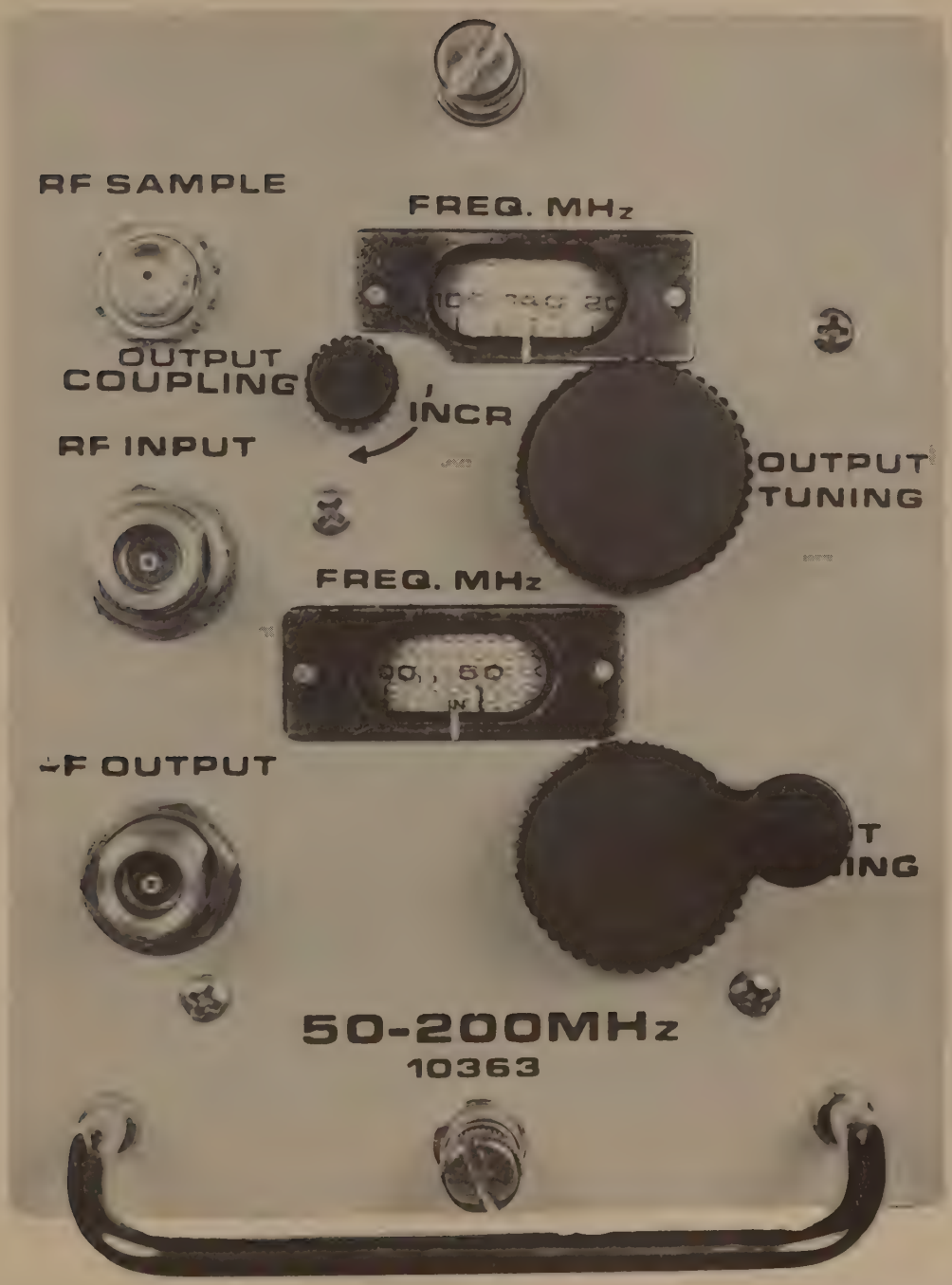

RF SAMPLE
FREQ. MHz
OUTPUT
COUPLING
INCR
RF INPUT
OUTPUT
TUNING
FREQ. MHz
-F OUTPUT
50-200MHz
10363

FIGURE 5-2

FIGURE 5-3

FIGURE 5-4

6.0 INSTRUMENT CALIBRATION PROCEDURE

6-1. The following procedure is to be followed to verify operation within the U. S. Army Missile Command Specification, MIS-10277, requirements.

6-2. TEST PROCEDURES

6-3. VISUAL INDICATORS

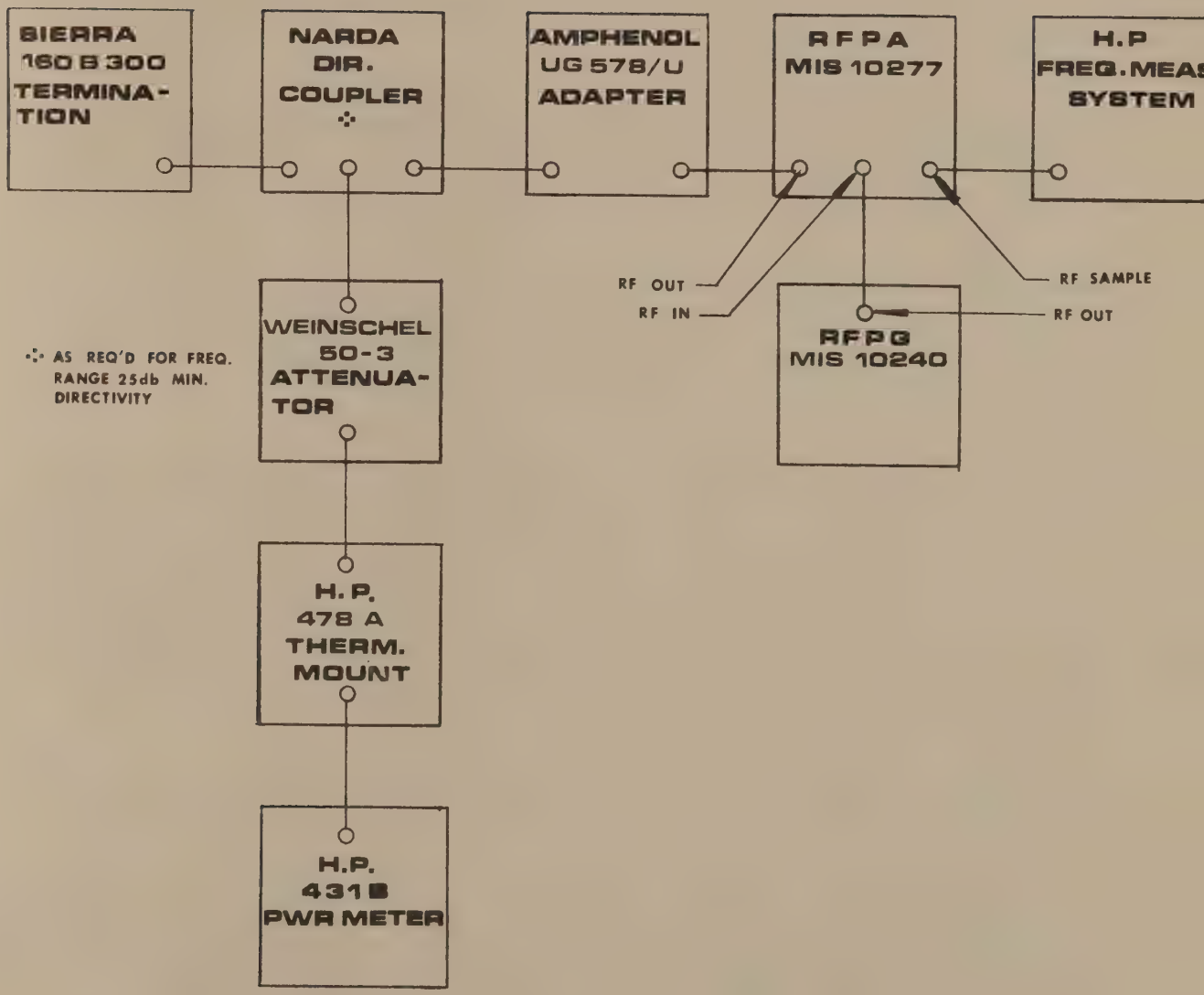
6-3-1 A.C. ON INDICATOR
Connect the equipment as shown in Figure 6-3 test setup. Apply 115VAC to the Model 10358 RF Power Amplifier, turn the AC "ON" switch to the "ON" position. Check to see that the "AC-ON" indicator light (AMBER) has been activated.

6-3-2 STANDBY INDICATOR
Connect the equipment as shown in Figure 6-3 test setup. Apply 115VAC to the Model 10358 RF Power Amplifier, turn the "AC-ON" switch to the "ON" position (the AC on indicator light (AMBER) will activate) after the time delay is complete (120 seconds) check to see that the "STAND-BY" indicator light (CLEAR) has been activated.

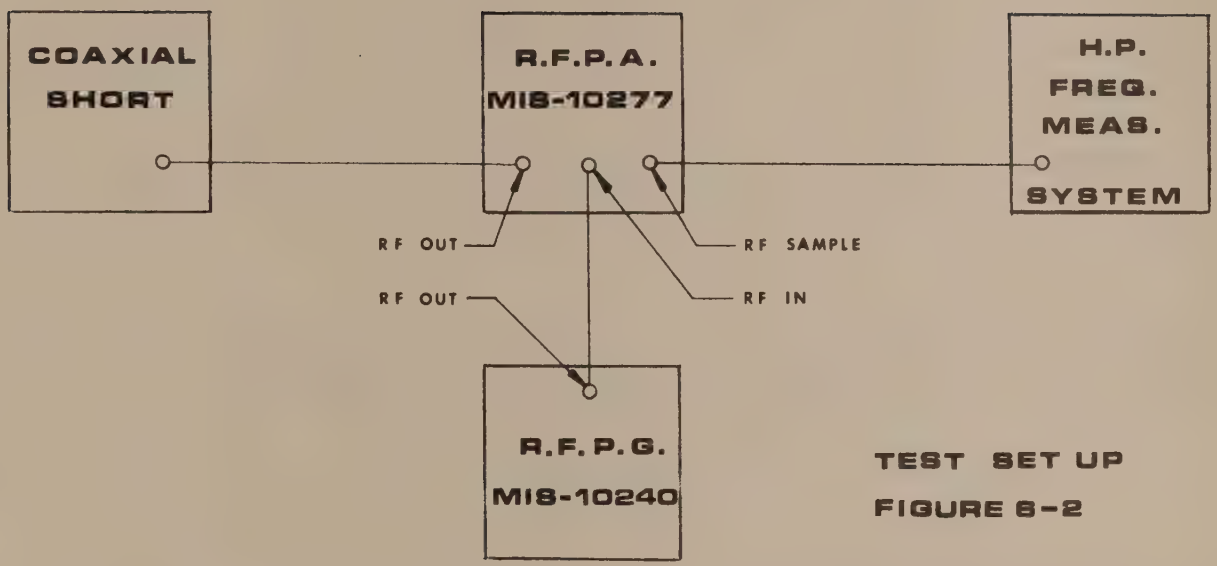
6-3-3 READY INDICATOR
Connect the test equipment as shown in Figure 6-3 test setup. Apply 115VAC to the Model 10358 RF Power Amplifier, turn the AC on switch to the "ON" position (the "AC-ON" indicator light (AMBER) will activate) after the time delay is complete (120 seconds) the "STANDBY" indicator light (CLEAR) will activate. Depress the "H.V.-ON" switch and check to see that the "READY" indicator light (RED) has been activated, and that the "STANDBY" light (CLEAR) has been deactivated. Activate the "STANDBY" switch and check to see that the "READY" indicator light (RED) has been deactivated and that the "STANDBY" indicator light (CLEAR) has been activated.

6-3-4 FAULT INDICATOR
The "FAULT" indicator operation will be tested for operation during the MISMATCH protection test.

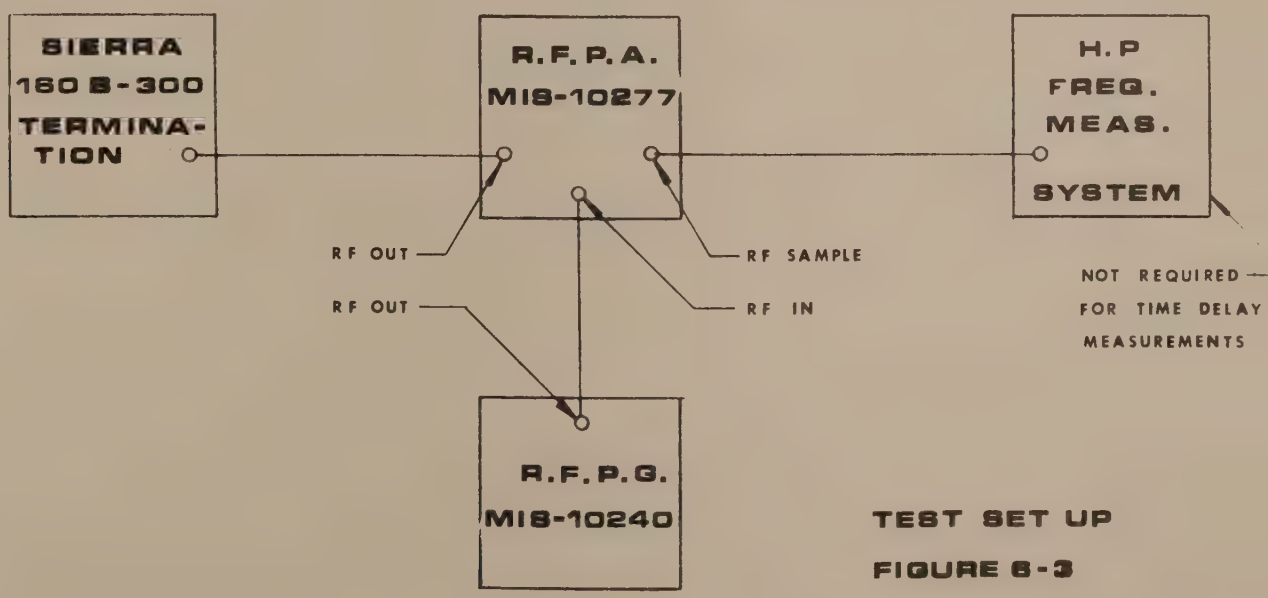
6-4. TIME DELAY
Connect the equipment as shown in Figure 6-3 test setup. Activate the "AC-ON" switch to the "ON" position (the AC-ON indicator light (AMBER) will activate). After activating the "AC-ON" switch, the time shall be recorded before the "STANDBY" indicator light (CLEAR) comes on. The time delay shall be between 100 and 140 seconds.



TEST SET UP
FIGURE 6-1



TEST SET UP
FIGURE 6-2



TEST SET UP
FIGURE 6-3

6-5. MISMATCH PROTECTION

6-5-1 OPEN CIRCUIT

Connect the test equipment as shown in Figure 6-1 test setup (refer to Section 5.0 Operation for Amplifier tuning procedure). At frequencies of 30, 125, 350 and 700 MHz. Adjust the RF Power output to 25 watts and disconnect the output cable. Check that the "FAULT" circuit operates.

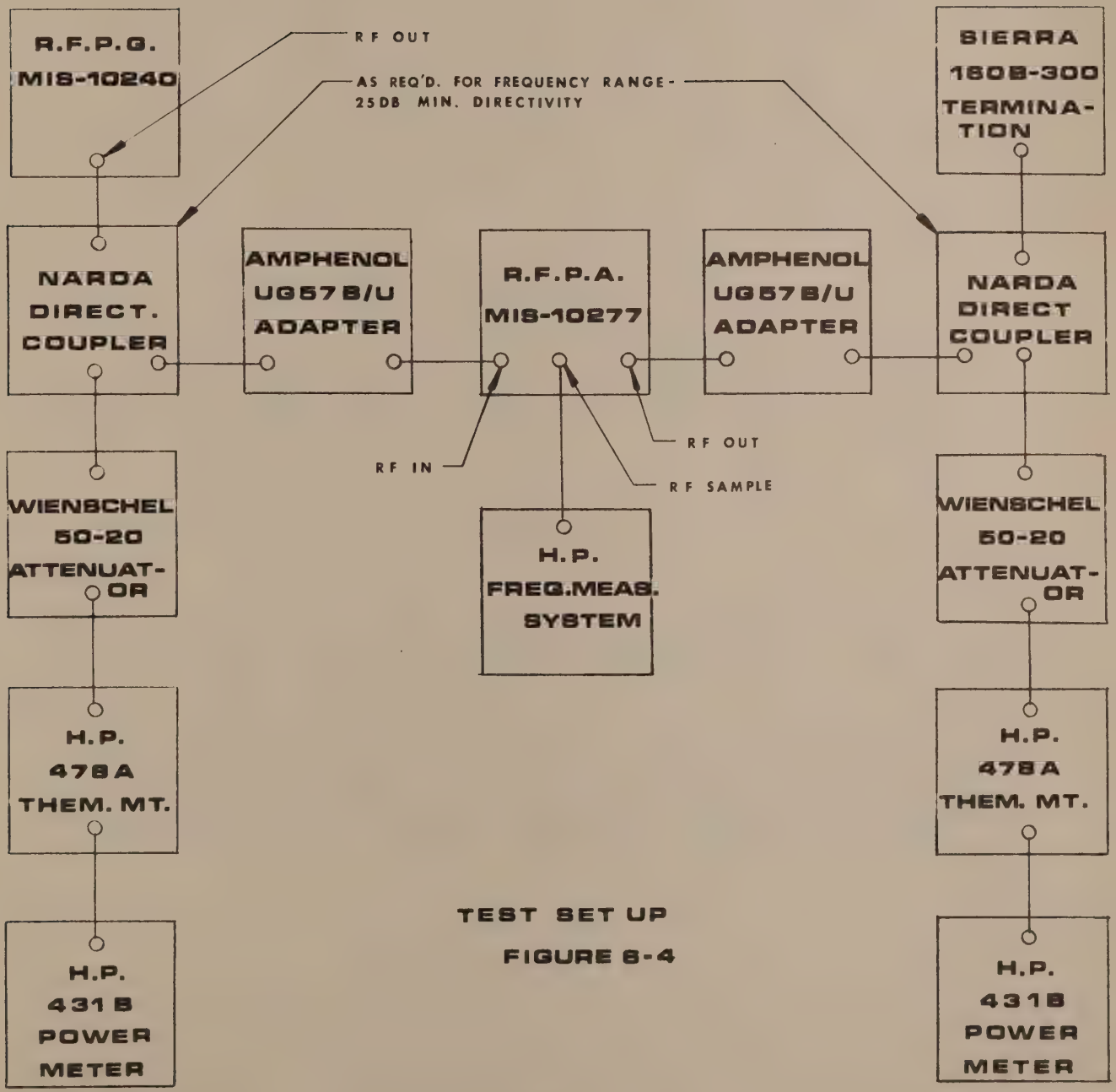
Connect the output cable and reset the fault circuit and increase the RF power output to the full rated power output of the RF power amplifier and disconnect the output cable. Verify that the "FAULT" circuit operates as follows: When the "FAULT" occurs, the "FAULT" indicator light (WHITE) will activate and the "READY" indicator light (RED will deactivate. To reset the fault circuit after a failure, the "RESET" switch has to be activated, this will cause the "FAULT" indicator light (WHITE) to deactivate and the "STANDBY" indicator light (CLEAR) will activate. To turn the system on activate, the "HV-ON" switch is activated the "STANDBY" indicator light (CLEAR) will deactivate and the "READY" indicator light (RED) will activate.

6-5-2 SHORT CIRCUIT

Connect the test equipment as shown in Figure 6-2 test setup. (Refer to Section 5.0 Operation Amplifier Tuning Procedure). At frequencies of 30, 125, 350 and 700 MHz, attempt to increase the RF power output of the RF Power Generator from zero. Verify that the fault circuit operates when the RF power output is increased to a value between 15 and 20 watts. Verify that the "FAULT" circuit operates as follows: When the "fault" occurs, the "FAULT" indicator light (WHITE) will activate and the "READY" indicator light (RED) will deactivate. To reset the fault circuit after a failure, the "RESET" switch has to be activated, this will cause the "FAULT" indicator light (WHITE) to deactivate and the "STANDBY" indicator light (CLEAR) will activate. To turn the system on activate the "HV-ON" switch, when the "HV-ON" switch is activated, the "STANDBY" indicator light (CLEAR) will deactivate and the "READY" indicator light (RED) will activate.

6-6. FREQUENCY RANGE

Connect the test equipment as shown in Figure 6-4 test setup (refer to Section 5.0 Operation for Amplifier Tuning Procedure). Check that each range meets or exceeds the following requirements.



TEST SET UP

FIGURE 6-4

FREQUENCY RANGE	TUNING RANGE
10MHz - 50MHz	9.9MHz - 50.5MHz
50MHz - 200MHz	49.5MHz - 202 MHz
200MHz - 500MHz	198MHz - 505 MHz
500MHz - 1000MHz	495MHz - 1010MHz

6-7. POWER OUTPUT

Connect the test equipment as shown on Figure 6-4 test setup (refer to Section 5.0 Operation for Amplifier Tuning Procedure). Check that the RF Power output of the RF Power Amplifier meets or exceeds the following limits.

FREQUENCY RANGE	TEST FREQUENCY	RF POWER OUTPUT
10MHz - 50MHz	30MHz	200 Watts Min.
50MHz - 200MHz	125MHz	200 Watts Min.
200MHz - 500 MHz	350MHz	200 Watts Min.
500MHz - 1000MHz	700MHz	100 Watts Min.

6-8. GAIN STABILITY

Connect the test equipment as shown in Figure 6-4 test setup (refer to Section 5.0 Operation for Amplifier Tuning Procedure). At test frequencies of 30, 125, 350 and 700 MHz set the RF Power output of the RF Power Amplifier to its maximum rated power output. Allow a suitable stabilization period, but not more than 2 hours, then check that the gain does not vary more than plus or minus 0.2db per hour after 2 hours of operation with a constant load, ambient temperature, frequency and line voltage. Monitor the frequency of the frequency measuring system and line voltage each time data is taken. Caution: The input frequency and line voltage controls shall not be adjusted during the test.

6-9. FREQUENCY READOUT DEVICES ACCURACY

Connect the test equipment as shown in Figure 6-3 test setup (refer to Section 5.0 Operation for Amplifier Tuning Procedure). With the RF Power Amplifier operating at its maximum rated power output the frequency readout devices should meet the following requirements after 30 minutes operation.

FREQUENCY RANGE	TEST FREQUENCIES	ACCURACY
10MHz - 50MHz	10, 30 & 50 MHz	±20%
50MHz - 200MHz	50, 125 & 200 MHz	±20%
200MHz - 500MHz	200, 350 & 500 MHz	±10%
500MHz - 1000MHz	500, 700 & 1000 MHz	±10%

6-10. FORWARD RF POWER METER ACCURACY

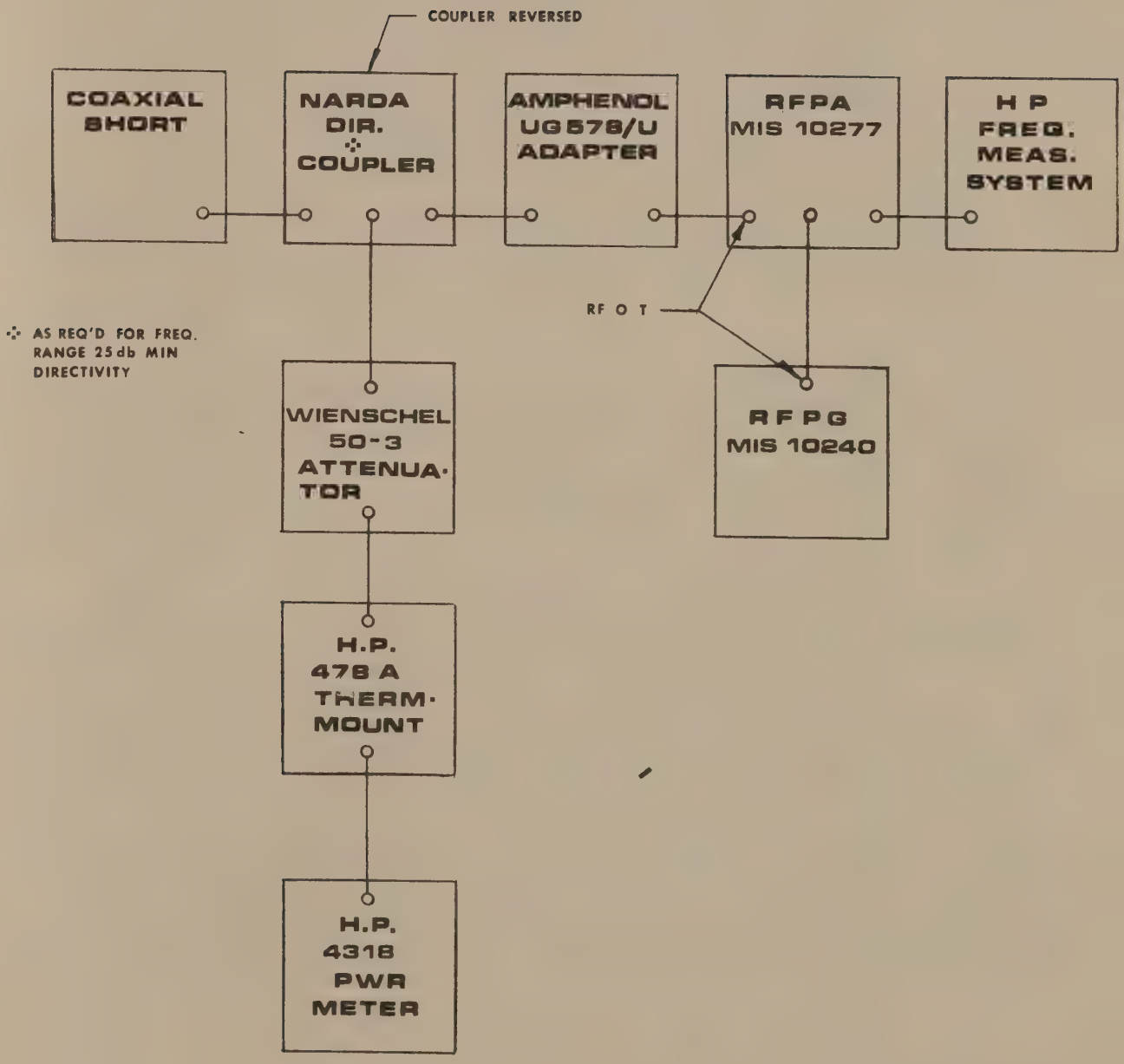
Connect the test equipment as shown in Figure 6-1 test setup (refer to Section 5.0 Operation for Amplifier Tuning Procedure). At frequencies of 30, 125, 350 and 700 MHz with the RF Power Amplifier operating at its maximum rated power output, the RF power meter shall indicate the forward RF power at the RF Power output receptacle within 10% of full scale when terminated in a nominal 50 ohm load with a SWR not greater than 1.1: .

6-11. REFLECTED RF POWER METER ACCURACY

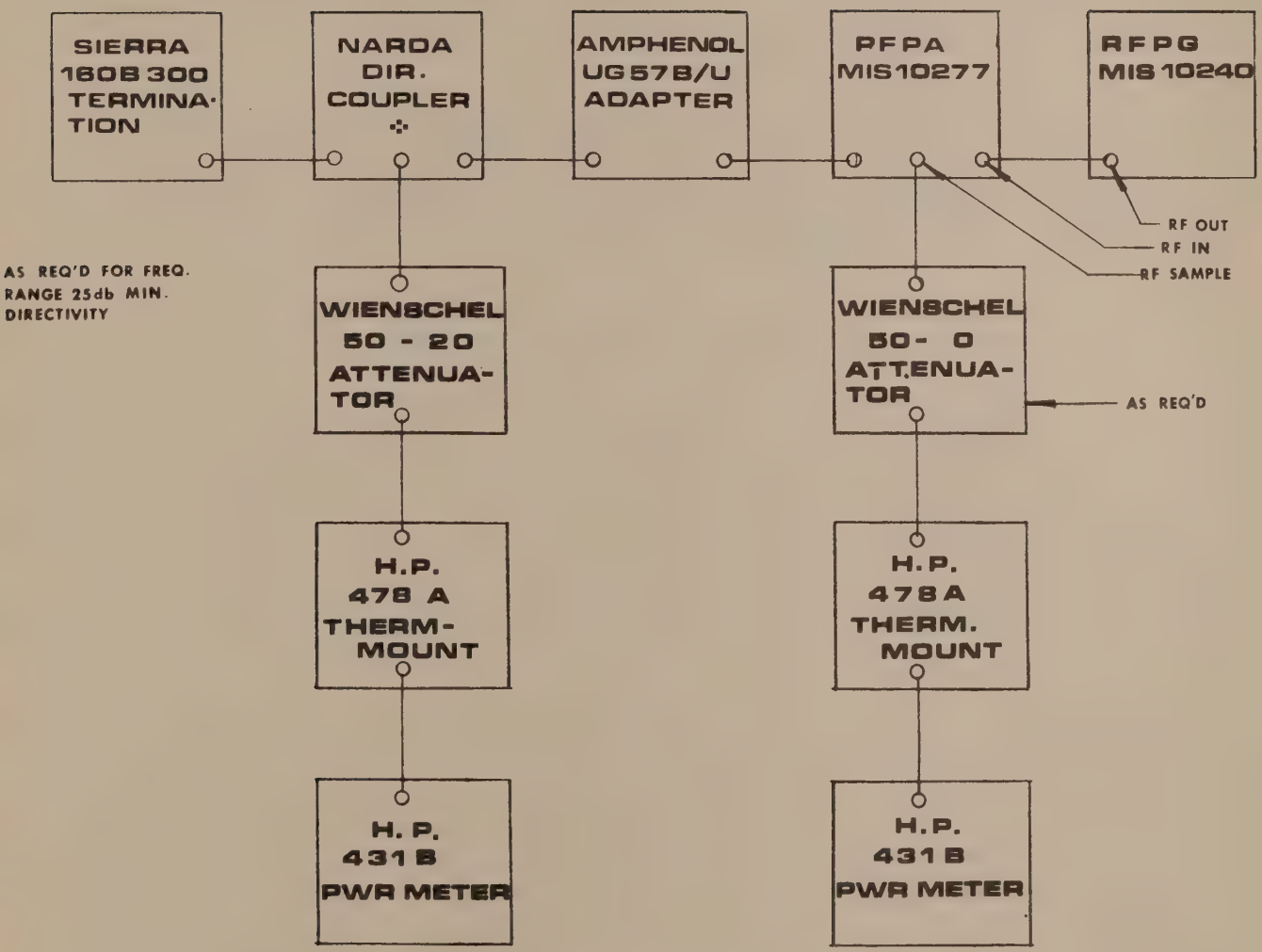
Connect the test equipment as shown in Figure 6-5 test setup (refer to Section 5.0 Operation for Amplifier Tuning Procedure). At frequencies of 30, 125, 350 and 700 MHz, adjust the RF power generator RF power output from 0 to obtain 20 watts reflected RF power on the RF power meter (H.P. 431C). The reflected power meter on the RF Power Amplifier shall indicate the reflected power, at the RF power output receptacle within 10 percent of full scale.

6-12 RF SAMPLE SIGNAL LEVEL

Connect the test equipment as shown in Figure 6-6 test setup (refer to Section 5.0 Operation for Amplifier tuning procedure). At frequencies of 30, 125, 350 and 700 MHz with the RF Power Amplifier operating at its maximum rated power out, the signal level at the RF sample output connector shall be as listed below.



TEST SET UP
FIGURE 6-5



TEST SET UP
FIGURE 6-6

FREQUENCY RANGE	TEST FREQUENCY	SAMPLE SIGNAL LEVEL
10 MHz - 50MHz	30 MHz	-43 ± 3db
50 MHz - 200MHz	125 MHz	-33 ± 3db
200 MHz - 500 MHz	350 MHz	-33 ± 3db
500 MHz - 1000MHz	700 MHz	-33 ± 3db

6-13. RISE AND FALL TIME

6-13-1 Internal Modulation

Connect the test equipment as shown in Figure 6-7 test setup (refer to Section 5.0 Operation for Amplifier Tuning Procedure). With the RF power generator set for 1 kilohertz internal square wave mode, and the RF power amplifier operating at its maximum rated power output - the RF Power Amplifier output signal shall meet or exceed the following combined rise and fall time limit.

FREQUENCY RANGE	TEST FREQUENCY	LIMITS
10 MHz - 50MHz	30 MHz	<4μsec.
50 MHz - 200MHz	125 MHz	<4μsec.
200MHz - 500MHz	350 MHz	<2μsec.
500MHz - 1000MHz	700 MHz	<2μsec.

6-13-2 EXTERNAL MODULATION

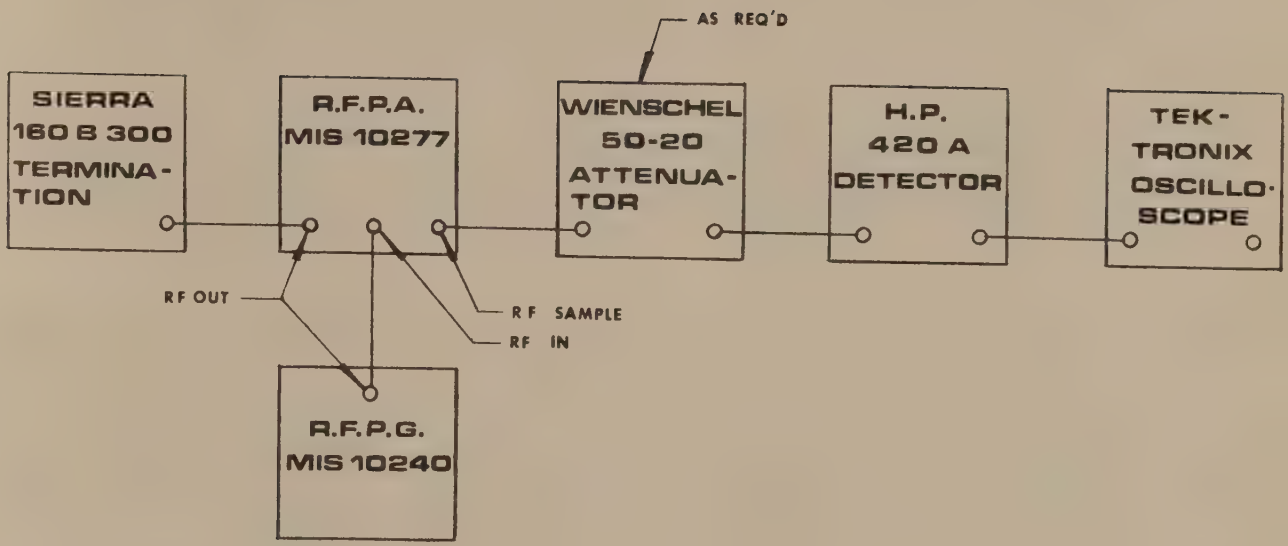
Connect the test equipment as shown in Figure 6-8 test setup (refer to Section 5.0 Operation for Amplifier Tuning Procedure). With the pulse generator set for a pulse width of 5 microseconds at a pulse repetition frequency of 1,000 pulses per second and with the RF Power Generator set for pulse mode, the RF Power Amplifier output signal shall meet or exceed the following combined rise and fall time limits

FREQUENCY RANGE	TEST FREQUENCY	LIMITS
10MHz - 50MHz	30MHz	4 microseconds
50MHz - 200 MHz	125MHz	4 microseconds
200MHz - 500 MHz	350MHz	2 microseconds
500MHz - 1000 MHz	700MHz	2 microseconds

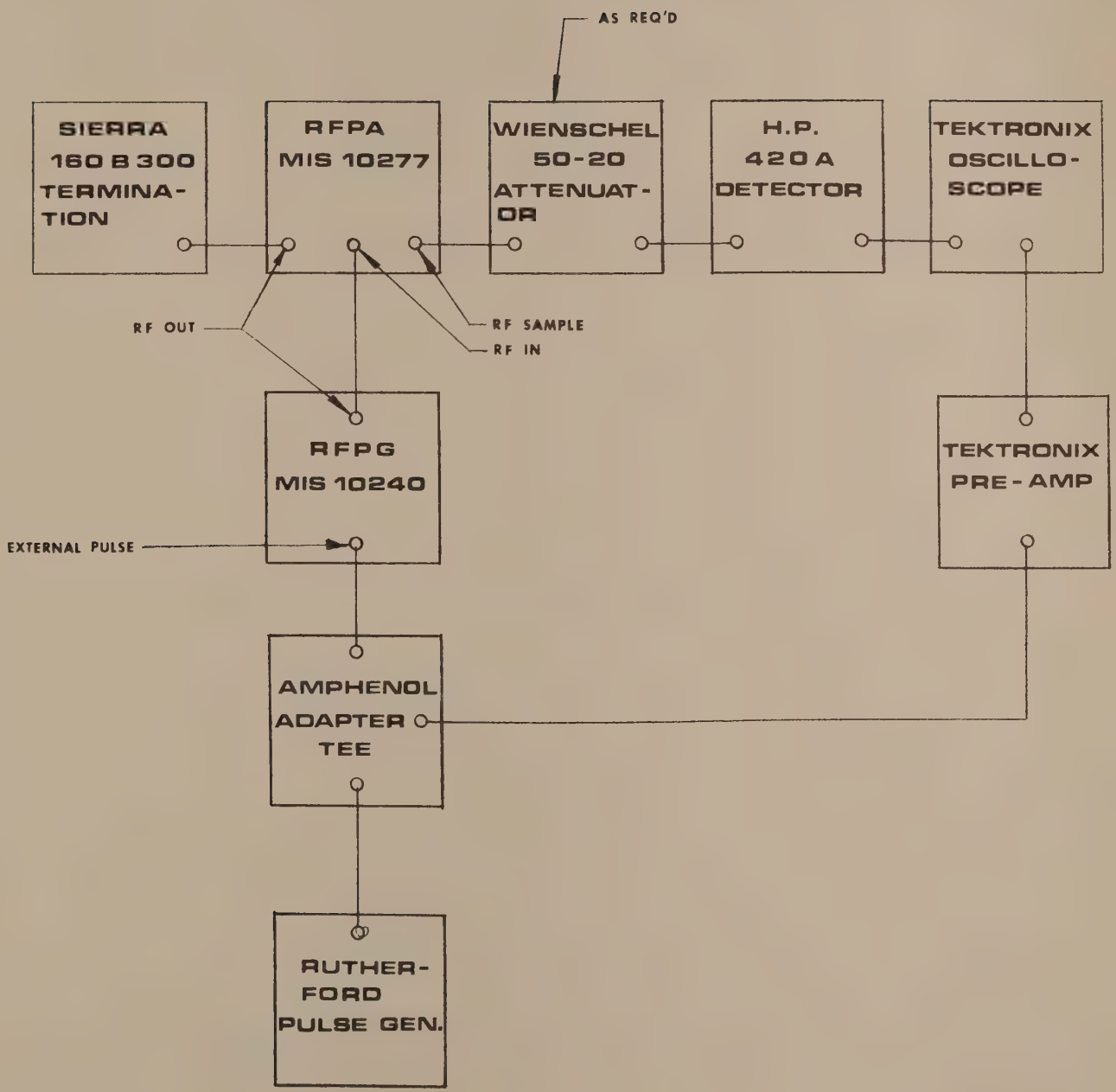
6-14. RESIDUAL AM

Connect the test equipment as shown in Figure 6-7 test setup (refer to Section 5.0 Operation for Amplifier Tuning Procedure). The residual amplitude modulation (AM) which may appear on the output signal shall not exceed 2% when operated in accordance with the following:

Frequency Range	Test Frequency	Mode	Power Output
10MHz - 50MHz	30 MHz	CW	100 watts & 200 watts
50MHz - 200MHz	125MHz	CW	100 watts & 200 watts
200MHz - 500MHz	350MHz	CW	100 watts & 200 watts
500MHz - 1000MHz	700MHz	CW	50 watts & 100 watts



TEST SET UP
FIGURE 6-7



TEST SET UP
FIGURE 6-8

7.0 MAINTENANCE

7-1. TUBE REPLACEMENT

7-2. Defective or weak tubes should be replaced immediately, continued operation with weak or defective tubes may degrade other components and system performance.

CAUTION: When removing or replacing tubes, extreme care should be taken to insure proper seating of the tube.

7-3. Plug-in R.F. Amplifier module tubes. The R.F. Power Amplifier tube is located within the R.F. Power Amplifier cavity contained on each of the plug-in modules. Due to the differences in frequency coverage of the plug-in R.F. Amplifier modules cavity construction varies, making unique disassembly procedures necessary for tube replacement.

7-4. Models 10359 and 10363 plug-in R.F. Amplifier Modules

1. Remove the four #4-40X 5/16 Flat Head screws securing the vent assembly to the cavity top plate. (See Figure 7-1.)
2. Remove the vent assembly from the cavity top plate.
3. Remove the RFI Gasket from the cavity top plate.
4. Remove the tube by rotating clockwise while pulling straight out.
5. Replace the tube by rotating clockwise while applying pressure straight in.

   CAUTION: Exercise extreme care when inserting tube to insure proper alignment in tube socket. (See Figure 7-2.)

6. Replace RFI Gasket on cavity top plate. Align holes to insure proper seating.
7. Replace vent assembly on cavity top plate, align holes to insure proper mating of vent assembly, RFI Gasket and cavity top plate.
8. Replace the four 4-40X 5/16 flat head screws and secure vent cover assembly, and RFI Gasket to the cavity top plate.

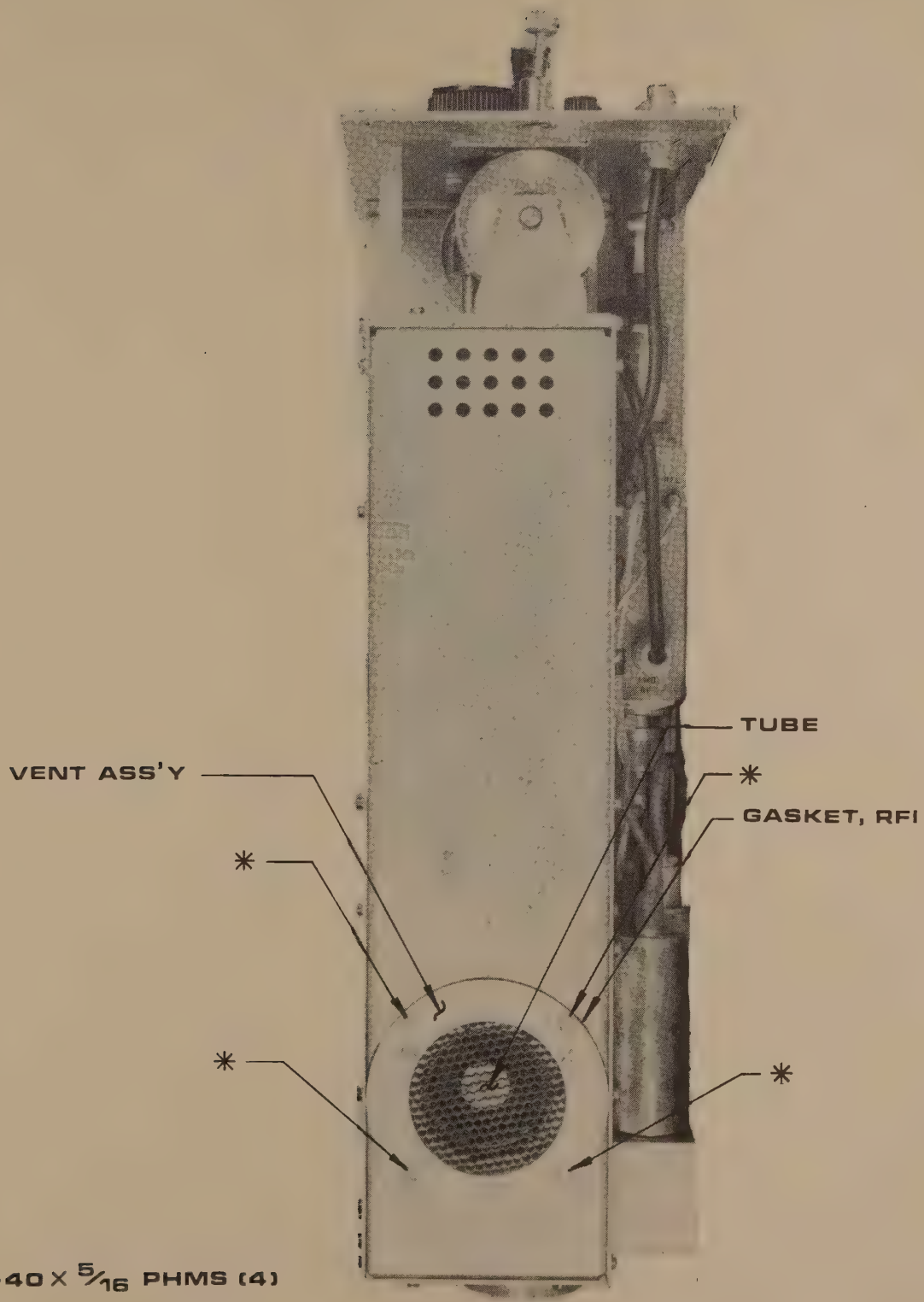


FIG. 7-1

TUBE TYPE

B11029-699

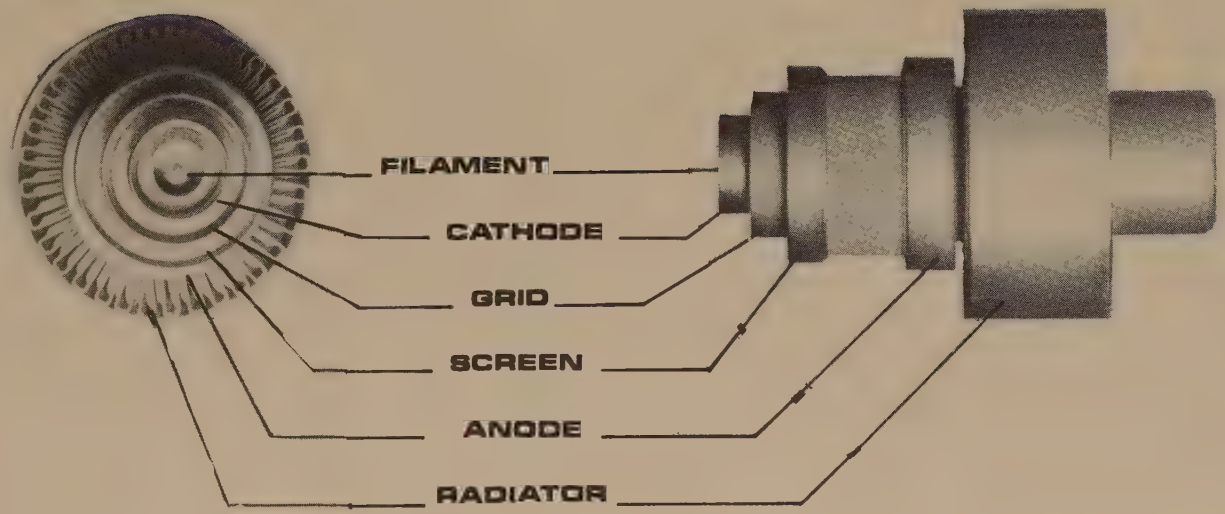


FIGURE 7-2

7-5. Models 10364 and 10365 Plug-in R.F. Amplifier Modules.

1. Rotate the output tuning control to the highest frequency indicated on the frequency readout device.

2. Remove the four 4-40X 1/2 Machine Screws, Lock Washers and Flat Washers securing the vent assembly to the cavity shell (See Figure 7-3).

3. Remove the vent assembly.

4. Remove the tube by rotating clockwise while pulling straight out.

5. Replace the tube by rotating clockwise while applying pressure straight in.

   CAUTION: Exercise extreme care when inserting tube to insure proper alignment in the tube socket. (See Figures 7-2 and 7-4).

6. Replace the vent assembly on the cavity shell.

7. Replace the four 4-40X 1/2 Machine Screws, Lock Washers, Flat Washers and secure vent assembly to the cavity shell.

7-6. CLEANING AND LUBRICATION

7-7. Lubrication and cleaning is recommended at periodic intervals to promote long-life of mechanical parts and insure trouble free operation of the MCL Model 10358 R.F. Power Amplifier. Exterior surfaces may be cleaned using a soft clean cloth moistened with ISOPROPYL alcohol. Interior components are normally kept clean by circulated filtered air, by means of the left hand panel filter assembly. Should any build up of dirt be noted in the interior, it may be removed by using a small, bristle brush and then wiped clean with a soft clean cloth moistened with ISOPROPYL Alcohol.

7-8. FILTER CLEANING

The filter assembly located on the left hand panel of the Model 10358 R.F. Power Amplifier should be cleaned at least once every 30 days or as often as environmental conditions may require.

7-9. AIR FILTER REMOVAL

The steps listed below should be followed in the removal and cleaning of the Air Filter:

1. Remove the 4-40X 7/16 Machine Screws, Lock Washer and Flat Washers securing the filter hold down bracket to the left side panel. (See Figure 7-5).

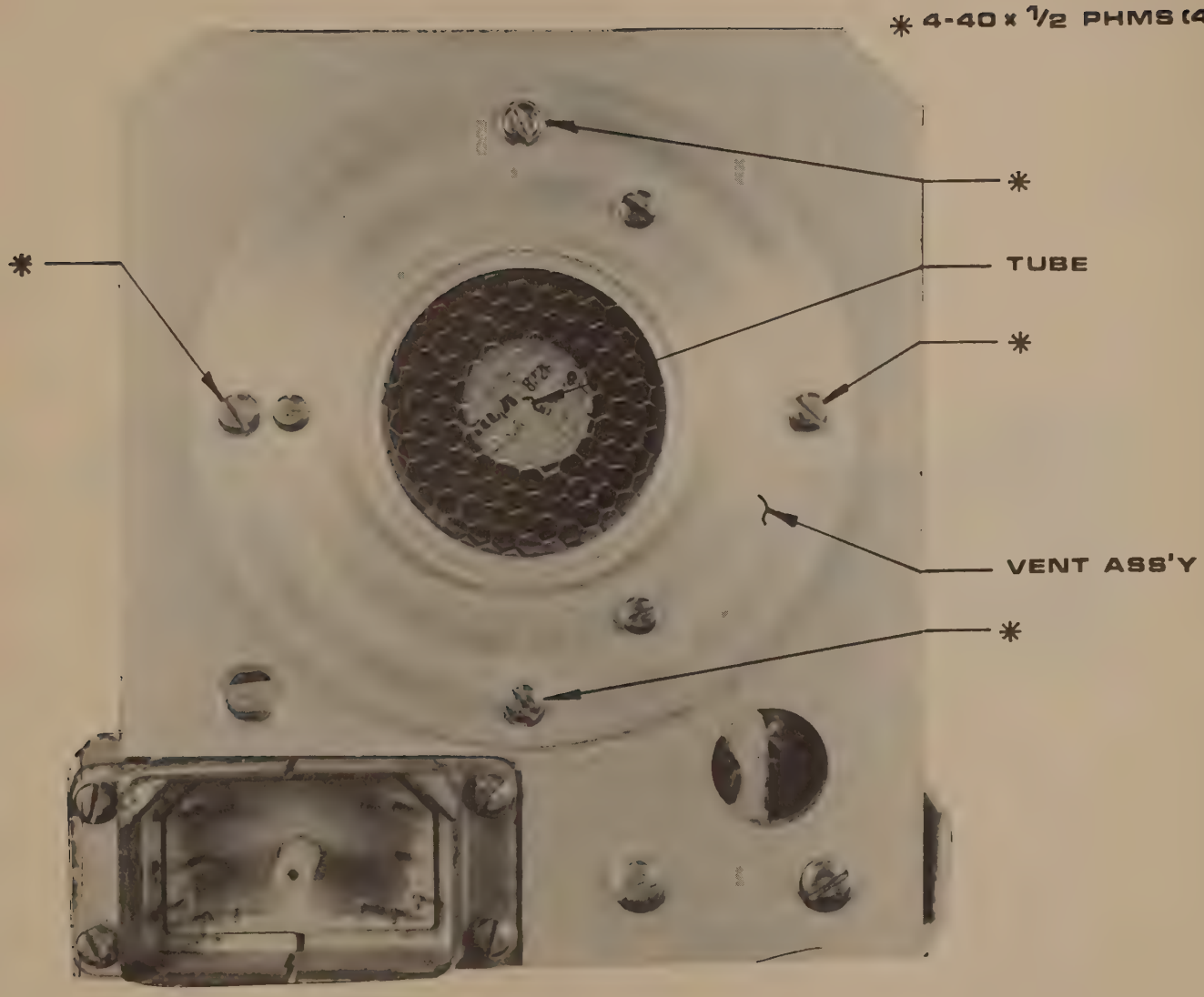


FIG. 7-3

TUBE TYPE

2781156

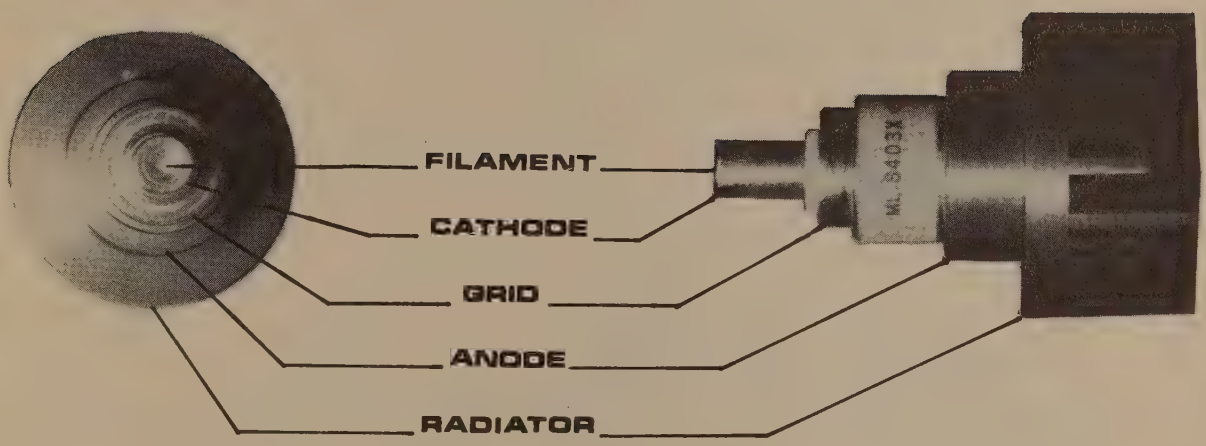


FIGURE 7-4

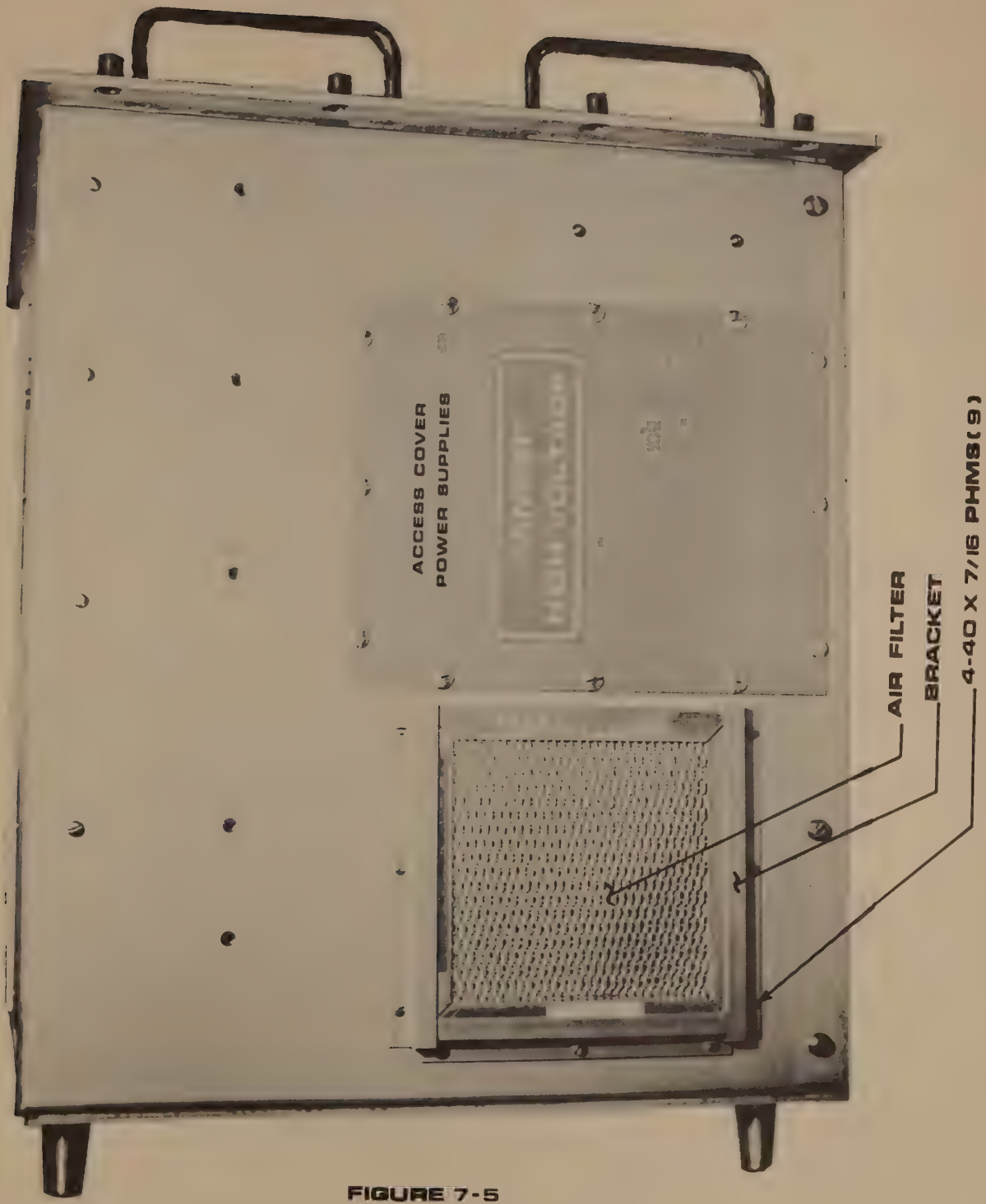

ACCESS COVER
POWER SUPPLIES
HIGH VOLTAGE
AIR FILTER
BRACKET
4-40 X 7/16 PHMS(9)

FIGURE 7-5

2. Remove the filter hold down bracket from the left side panel.

3. Remove the Air Filter by sliding the air filter towards the rear panel.

4. Clean the Air Filter in hot water and allow to dry.

5. Spray filter with Air Kontrol Filter Spray, manufactured by Air-Kontrol Filter Manufacturing Company, Incorporated, Memphis, Tennessee.

6. Replace Air Filter by sliding Air Filter into position from the rear panel.

7. Replace the filter hold down bracket on the left side panel.

8. Replace the 4-40X 7/16 Machine Screws, Lock Washers, Flat Washers, and secure the filter hold down bracket to the left side panel.

7-10. ACCESSIBILITY

The Microwave Cavity Laboratories Model 10358 R.F. Power Amplifier has been designed to permit easy access to all components and assemblies for service and adjustment. Access to desired areas is made possible by providing removeable panels. Each panel has so been designed (including wiring harness) that it can be removed and laid down flat to provide ready access to components or assemblies in question. Figures 7-6 to 7-10 show all panels.

7-11. TOP PANEL REMOVAL

To remove the top panel, remove the 15, 4-40X 5/16" pan head machine screws holding the top panel to the right, left and rear panels (See Figure 7-6). Removal of the top panel provides access to all test points and adjustments (See Figures 7-12 and 7-13).

7-12. FRONT PANEL REMOVAL

To remove the front panel of the Model 10358 R.F. Power Amplifier, the following procedure should be followed (See Figure 7-7).

1. Remove the Plug-in RF Modules from the Model 10358 RF Power Amplifiers.

2. Remove the top panel.

3. Remove the 12, 4-40X 5/8" Phillips pan head machine screws securing the tunnel assembly to the front panel.

4. Remove the 13, 10-32X ½" Phillips oval head machine screws.

5. Remove the 4, 4-40X 5/16" pan head machine screws securing the line cord to the rear panel (See Figure 7-10).

6. Lay the front panel face down.

Removal of the front panel will provide access to meters M101 and M102, circuit breaker CB101, switches S101, S102, S103, S104 and S105 and all components associated with and mounted on the front panel. Front panel removal permits ready access to power supplies PS102 and PS103 relays K101 through K107 and TB201 mounted on PS101. To replace the front panel, reverse the disassembly procedure.

7-13. LEFT SIDE PANEL REMOVAL

To remove the left side panel of the Model 10358 RF Power Amplifier, the following procedure should be followed (See Figure 7-8).

1. Remove the Plug-in RF Module from the Model 10358 RF Power Amplifier.

2. Remove the top panel.

3. Remove the 12, 4-40X 5/8" Phillps pan head machine screws, securing the tunnel assembly to the front panel (See Figure 7-7).

4. Remove the 4, 10-32X ½" Phillips oval head machine screws securing the left side panel to the front panel (See Figure 7-7).

5. Remove the 5, 4-40X 3/8" pan head machine screws securing the tunnel assembly to the rear panel (See Figure 7-10).

6. Remove the 4, 10-32X ½" pan head machine screws securing the left side panel to the rear panel (See Figure 7-10).

7. Remove the 3, 10-32X ½" pan head machine screws securing the left side panel to the bottom panel (See Figure 7-8).

8. Lay the left side panel face down.

Removal of the left side panel will provide access to power supplies PS102 and PS103, blower B101, VSWR circuit, filters FL101 through FL103 and FL110 through FL116 and FL125 through FL127, test points TP101 through TP106 and TP110, potentiometers R102, R105, R106, R110, R115 and R116, switches S107 and S108, TB101, R109 and connector J103

mounted inside the tunnel assembly. To replace the left side panel reverse the disassembly process.

7-14. RIGHT SIDE PANEL REMOVAL

To remove the right side panel of the Model 10358 RF Power Amplifier, the following procedure should be followed (See Figure 7-9).

1. Remove the top panel.
2. Remove the 4, 10-32X ½" Phillips oval head machine screws securing the right side panel to the front panel (See Figure 7-7).
3. Remove the 4, 10-32X ½" pan head machine screws securing the right side panel to the rear panel (See Figure 7-10).
4. Remove the 5, 10-32X ½" pan head machine screws securing the right side panel to the bottom panel (See Figure 7-9).
5. Lay the right side panel face down.

CAUTION: Adequate support must be provided for the right side panel during the disassembly procedure due to the weight of PS101.

Removal of the right side panel provides access to PS101, relays K101 through K107, switch S106, transformer T102, terminal boards TB101, 103, 104 and 105 filters FL104 through FL109 indicator lights DS101 through DS104. To replace the right side panel reverse the disassembly process.

7-15. REAR PANEL REMOVAL

To remove the rear panel of the Model 10358 R.F. Power Amplifier, the following procedures should be followed (See Figure 7-10).

1. Remove the top panel (See Figure 7-6).
2. Remove the 5, 4-40X 3/8" pan head machine screws securing the tunnel assembly to the rear panel (See Figure 7-10).
3. Remove the 4, 4-40X 5/16" pan head machine screws securing the line cord to the rear panel (See Figure 7-10).
4. Remove the 13, 10-32X 1/2" pan head machine screws securing the back panel to the left, right, and bottom panels (See Figure 7-10).
5. Lay the rear panel face down.

FIG. 7-6

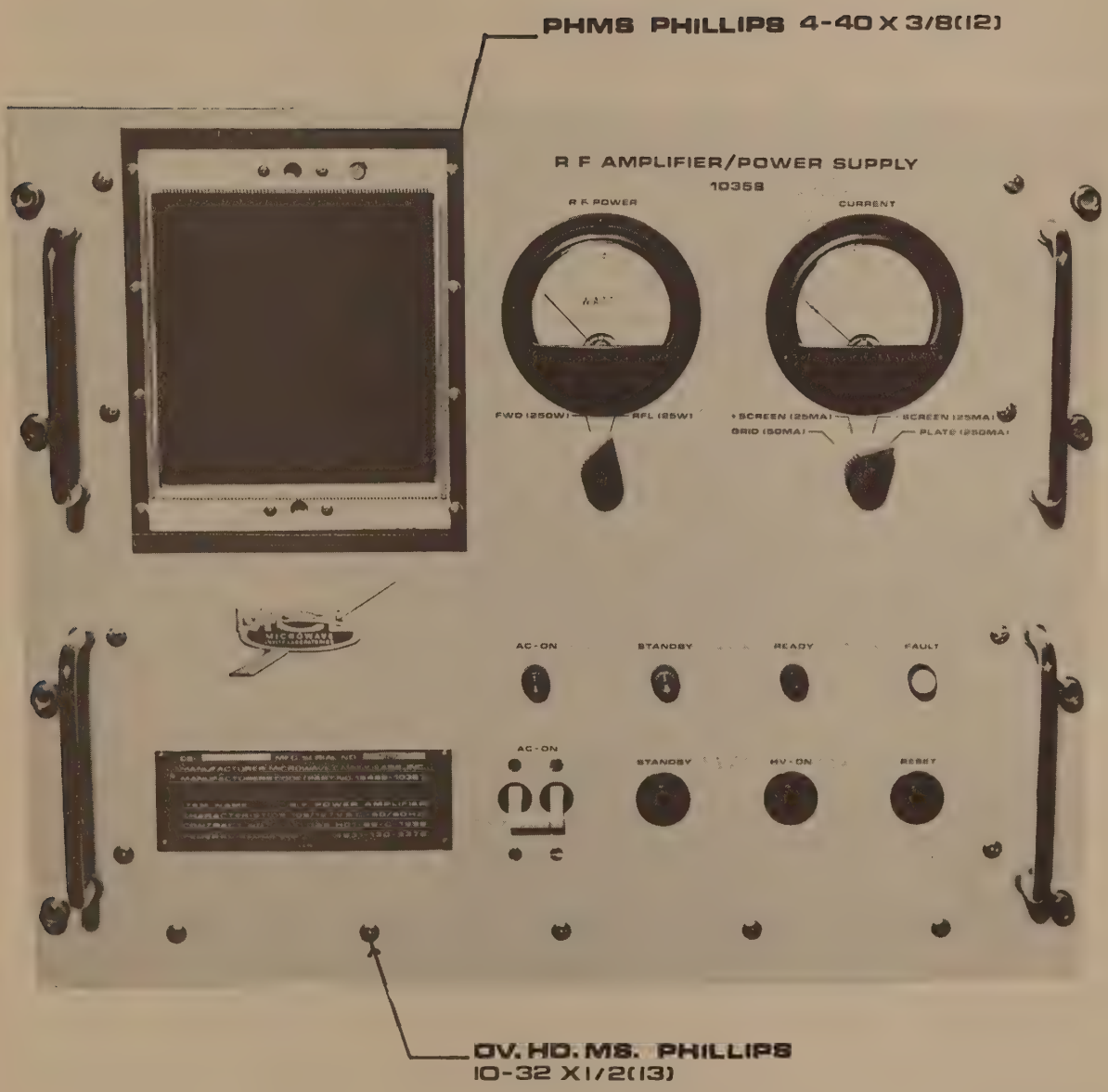

PHMS PHILLIPS 4-40 X 3/8(12)
R F AMPLIFIER/POWER SUPPLY
10358
R F POWER
CURRENT
FWD (250W)
RFL (25W)
+SCREEN (25MA)
-SCREEN (25MA)
GRID (50MA)
PLATE (250MA)
AC-ON
STANDBY
READY
FAULT
AC-ON
STANDBY
HV-ON
RESET
OV. HD. MS. PHILLIPS
10-32 X 1/2(13)

FIGURE 7-7

Removal of the rear panel provides access to capacitor C101, transformer T102, terminal blocks TB103 and TB105 and switch S108. To replace the rear panel, reverse the disassembly procedure.

7-16. BOTTOM PANEL

Removal of all four panels (front, rear, left and right) frees the bottom panel for access. The bottom panel provides the mounting surface for capacitor C101, transformer T102, relay K101, terminal block TB101 and power supplies PS102 and PS103. With all four side panels disassembled and laying face down complete access to the Model 10358 R.F. Power Amplifier is provided.

7-17. ADJUSTMENTS

The power supplies contained within the MCL Model 10358 RF Power Amplifier contain the majority of the electronic circuitry employed in the basic unit along with adjustments and test points. These power supplies and associated circuitry may require minor alignment after the replacement of components. To insure that specified performance levels are met, the following paragraphs contain the necessary information to perform tests and adjustments.

All test points and adjustments are accessible from the top of the R.F. Power Amplifier when the top cover is removed.

CAUTION: When the top cover is removed and the top cover safety interlock is energized, voltages in excess of 2200 volts are present. Extreme care should be excercised in servicing this equipment with the high voltage on, since 2200 volts at greater than 200 milliamps is lethal.

7-18. FILAMENT SUPPLY

The filament supply is a solid state regulated DC power supply with the output voltage variable from 5.0VDC to 7.0VDC. Test points TP105 and TP106 are provided to monitor the filament voltage and R107 is provided to adjust the filament voltage level to the required limits. To adjust the filament voltage, the following steps should be observed.

1. Turn the "AC ON" switch of the Model 10358 RF Power Amplifier to the "OFF" position.

2. Connect the primary power input plug to 115 VAC-60Hz employing a variac to allow control of input power.

3. Insert plug-in R.F. Amplifier Module (all plug-in R.F. Amplifier modules operate at the same filament voltage).

4. Connect the equipment as shown in Figure 7-11 (See Figures 7-12 and 7-13).

5. Turn the "AC ON" switch of the Model 10358 R.F. Power Amplifier to the "ON" position. The "AC ON" indicator light (AMBER) will activate.

6. Wait and allow the unit to cycle to the stand-by mode, this will occur after the time delay cycle has been completed (approximately 120 seconds). At the end of the time delay cycle the "STANDBY" indicator light (CLEAR) will activate.

7. Insert the filament voltage monitoring device (Universal Poly Ranger Model USP or equivalent) into test points TP105 and TP106.

8. Loosen lock nut on R107.

9. Adjust R107 for 6.3VDC as measured on the filament voltage monitoring equipment.

10. Tighten lock nut on R107.

11. Turn "AC ON" switch of the Model 10358 R.F. Power Amplifier to the "OFF" position.

7-19. SCREEN SUPPLY

The screen supply is a solid state regulated D.C. Power Supply with the output voltage variable from 225VDC to 250VDC. Test points TP103 and TP104 are provided to monitor the screen voltage and R106 is provided to adjust the screen voltage level to the required limits. To adjust the screen voltage, the following steps should be observed:

1. Turn the "AC ON" switch of the Model 10358 RF Power Amplifier to the "OFF" position.

2. Connect the primary power input plug to 115VAC-60Hz employing a variac to allow control of input power.

3. Insert plug-in R.F. Amplifier Module (Models 10359, 10363 or 10364 TETRODE AMPLIFIERS -- NOTE: MODEL 10365 EMPLOYS A TRIODE AMPLIFIER).

4. Connect the equipment as shown in Figure 7-11 (See Figures 7-12 and 7-13).

5. Turn the "AC ON" switch of the Model 10358 R.F. Power Amplifier to the "ON" position. The "AC ON" indicator light (AMBER) will activate.

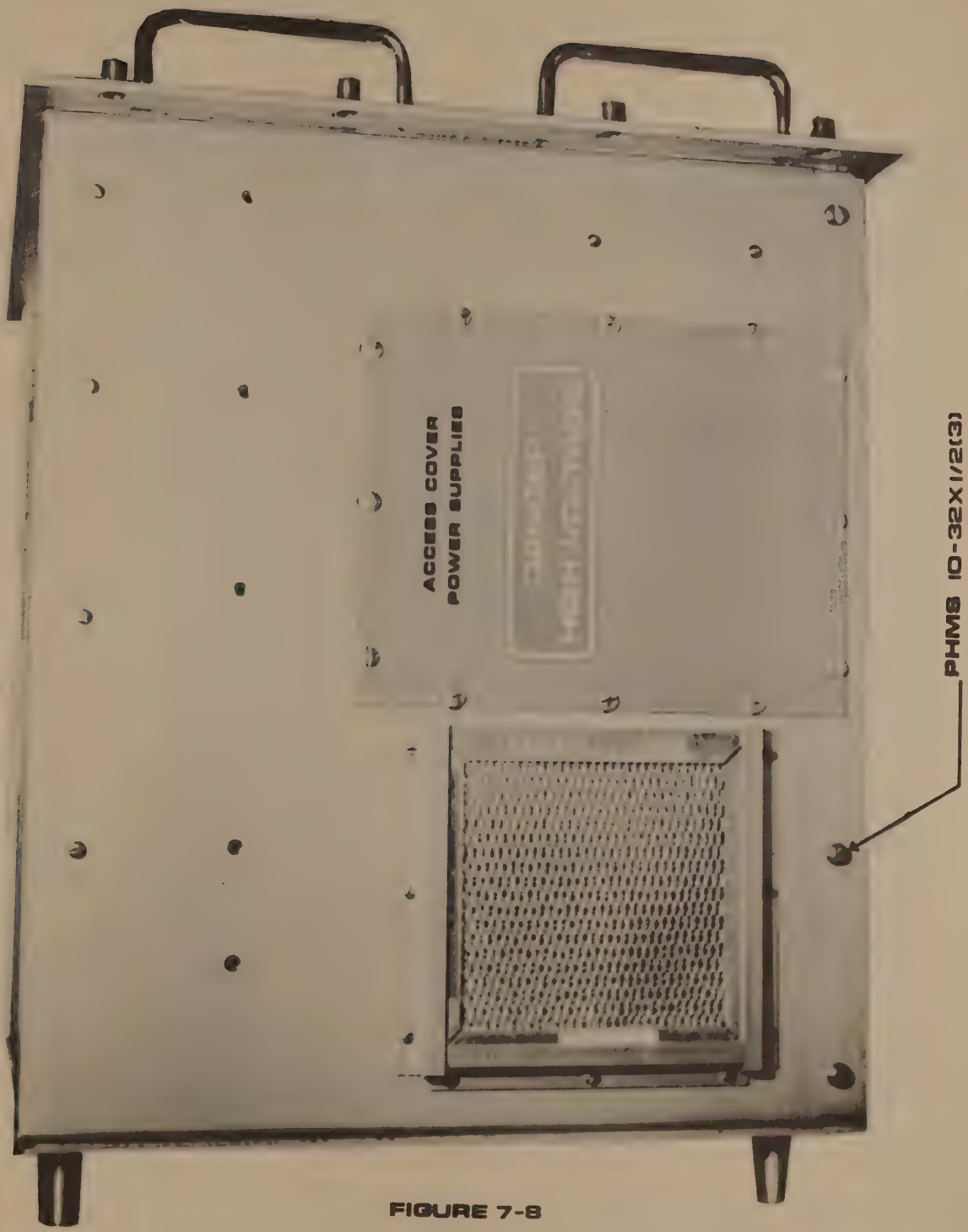


FIGURE 7-8

FIG. 7-9

6. Wait and allow the unit to cycle to the "STANDBY" mode, this will occur after the time delay cycle has been completed (approximately 120 seconds). At the end of the time delay cycle, the "STANDBY" indicator light (CLEAR) will activate.

7. Insert the screen voltage measuring devices (Universal Poly Ranger Model USP or equivalent) into test points TP103 and TP104.

8. Loosen lock nut on R106.

9. Depress the "HV ON" switch, the "READY" indicator light (RED) will activate and the "STANDBY" indicator light (CLEAR) will deactivate.

10. Adjust R106 to 250 VDC as measured on the screen voltage monitoring equipment.

11. Tighten lock nut on R106.

12. Depress the "STANDBY" switch, the "READY" indicator light (RED) will deactivate and the "STANDBY" indicator light (CLEAR) will activate.

13. Turn the "AC ON" switch of the Model 10358 R.F. Power Amplifier to the "OFF" position.

7-20. ANODE SUPPLY

The anode supply is a solid state unregulated D.C. power supply operating at a fixed output voltage utilizing a full wave bridge and pye type LC filter configuration. Test points TP101 and TP102 are provided to monitor a reduced voltage proportional to the anode supply voltage. To monitor the anode supply voltages, the following steps should be observed:

1. Turn the "AC ON" switch of the Model 10358 R.F. Power Amplifier to the "OFF" position.

2. Connect the primary power input plug into 115VAC-60Hz employing a variac to allow control of input power.

3. Insert desired plug-in R.F. Amplifier module (Models 10359, 10363, 10364 or 10365).

4. Connect equipment as shown in Figure 7-11 (See Figures 7-12 and 7-13).

5. Turn the "AC ON" Switch of the Model 10358 R.F. Power Amplifier to the "ON" position. The "AC ON" indicator light (AMBER) will activate.

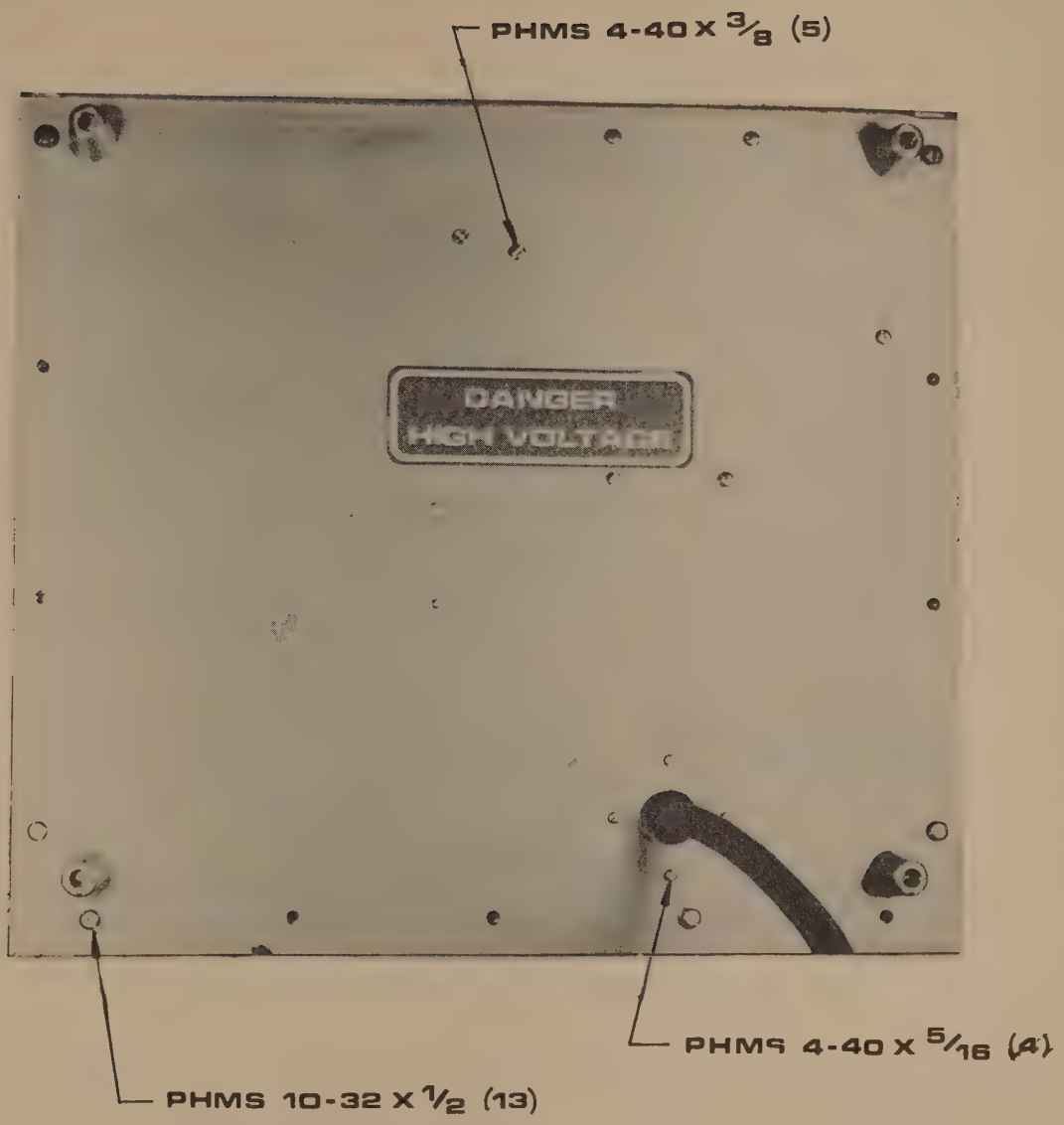
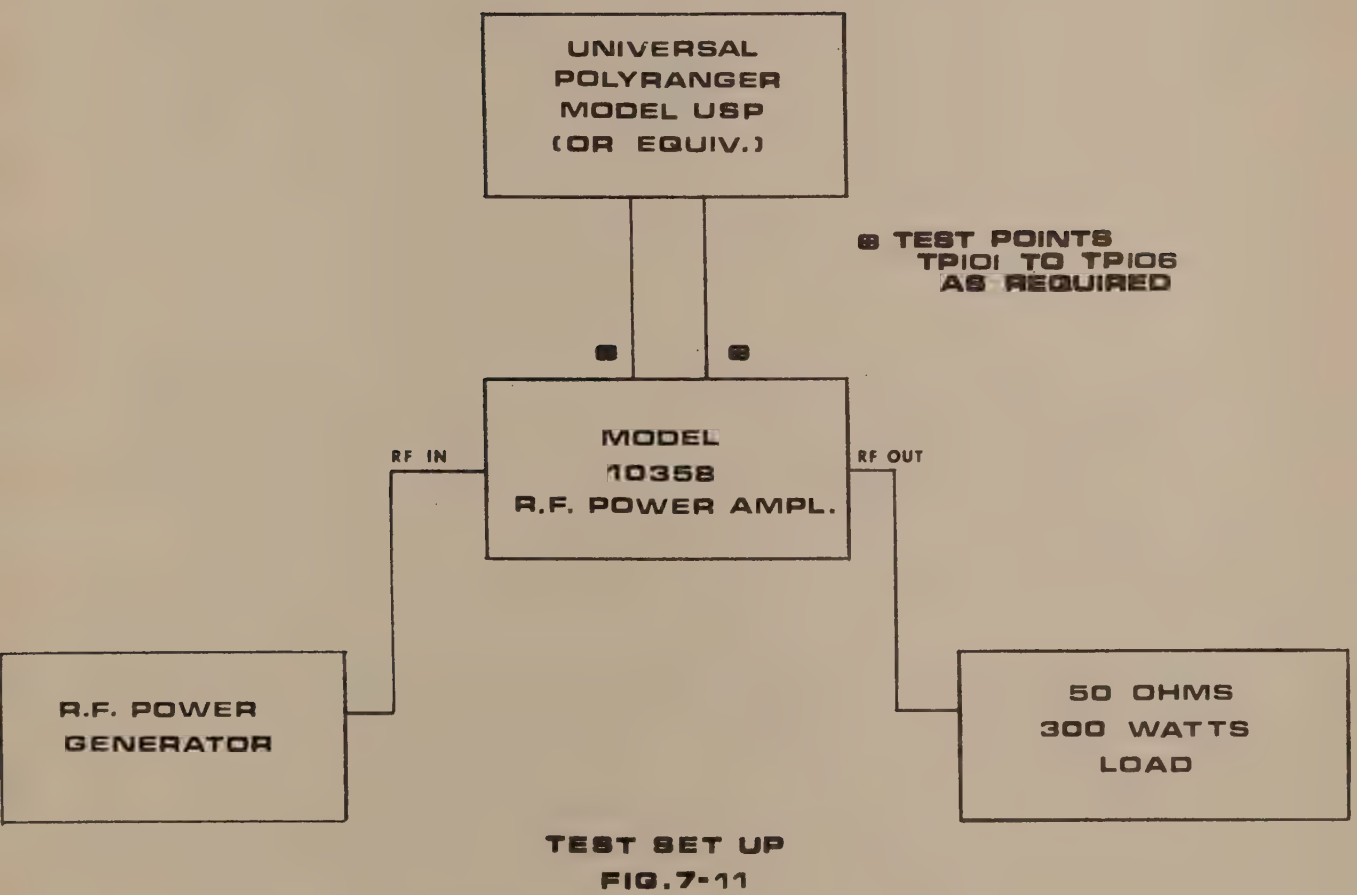

PHMS 4-40 X 3/8 (5)
DANGER
HIGH VOLTAGE
PHMS 4-40 X 5/16 (4)
PHMS 10-32 X 1/2 (13)

FIG. 7-10



TEST SET UP
FIG. 7-11

6. Wait and allow the unit to cycle to the "STANDBY" mode, this will occur after the time delay cycle has been completed (approximately 120 seconds). At the end of the time delay cycle the "STANDBY" indicator light (CLEAR) will activate.

7. Insert the Anode voltage measuring device (Universal Poly Ranger Model USP or equivalent) into test points TP101 and TP102.

8. Depress the "HV ON" switch, the "READY" indicator light (RED) will activate and the "STANDBY" indicator light (CLEAR) will deactivate.

9. Monitor the Anode voltage as indicated on the Anode voltage measuring device, the voltages should read as follows:

PLUG-IN MODEL	VOLTAGES
10359	100 VDC
10363	100 VDC
10364	100 VDC
10365	75 VDC

10. Depress the "STANDBY" switch, the "READY" indicator light (RED) will deactivate and the "STANDBY" indicator light (CLEAR) will activate.

11. Turn the "AC ON" switch of the Model 10358 R.F. Amplifier to the "OFF" position.

7-21. ANODE OVERCURRENT ADJUSTMENT

The anode overcurrent adjustment on the Model 10358 R.F. Power Amplifie is made in the "POWER OFF" mode. POWER OFF mode of adjustment requires the use of a variable voltage high current power supply and standard ammeter. The following procedure should be followed (Refer to Figures 7-12 and 7-13).

1. Set the current meter switch to the "+ Screen" position.

2. Connect a short heavy jumper from TP107 to TP109 (See Figure 7-13).

3. Connect a variable power supply and standard ammeter across TP102 and TP107 (See Figures 7-12 and 7-13).

4. Vary the power supply and adjust R102 (Figure 7-12) so that relay K104 operates at 260MA. (Note: Relay K104 should operate at not less than 250MA and not more than 270MA).

7-22. SCREEN OVERCURRENT ADJUSTMENT

The screen overcurrent adjustment on the Model 10358 R.F. Power Amplifier is made in the "POWER OFF" mode as indicated in paragraph 7-21. The following procedure should be followed (Refer to Figures 7-12 and 7-13).

1. Set the current meter switch to the "PLATE" position.

2. Connect a short heavy jumper from TP107 to TP109 (See Figure 7-13).

3. Connect a variable power supply and standard ammeter across TP104 and TP107 (See Figures 7-12 and 7-13).

4. Vary the power supply and adjust R110 (Figure 7-12) so that relay K103 operates at 30MA. (NOTE: Relay K103 should operate at not less than 25MA and not more than 35MA).

7-23. ANODE CURRENT METER

The calibration and adjustment of the anode current meter of the Model 10358 R.F. Power Amplifier is made in the "POWER OFF" mode as indicated in paragraph 7-21. The following procedure should be followed (Refer to Figures 7-12 and 7-13).

1. Set the current meter switch to the "PLATE" position.

2. Connect a short heavy jumper from TP107 to TP109 (See Figure 7-13).

3. Connect a variable power supply and standard ammeter across TP102 and TP109 (See Figure 7-13).

4. Vary the power supply for a calibration current of 250MA.

5. Adjust R105 (Figure 7-12) for a full scale reading of 250MA as indicated on the "CURRENT" meter.

7-24. GRID CURRENT METER

The calibration of the grid current meter of the Model 10358 R.F. Power Amplifier is made in the "POWER OFF" mode as indicated in paragrpah 7-21. The following procedure should be followed (Refer to Figures 7-12 and 7-13).

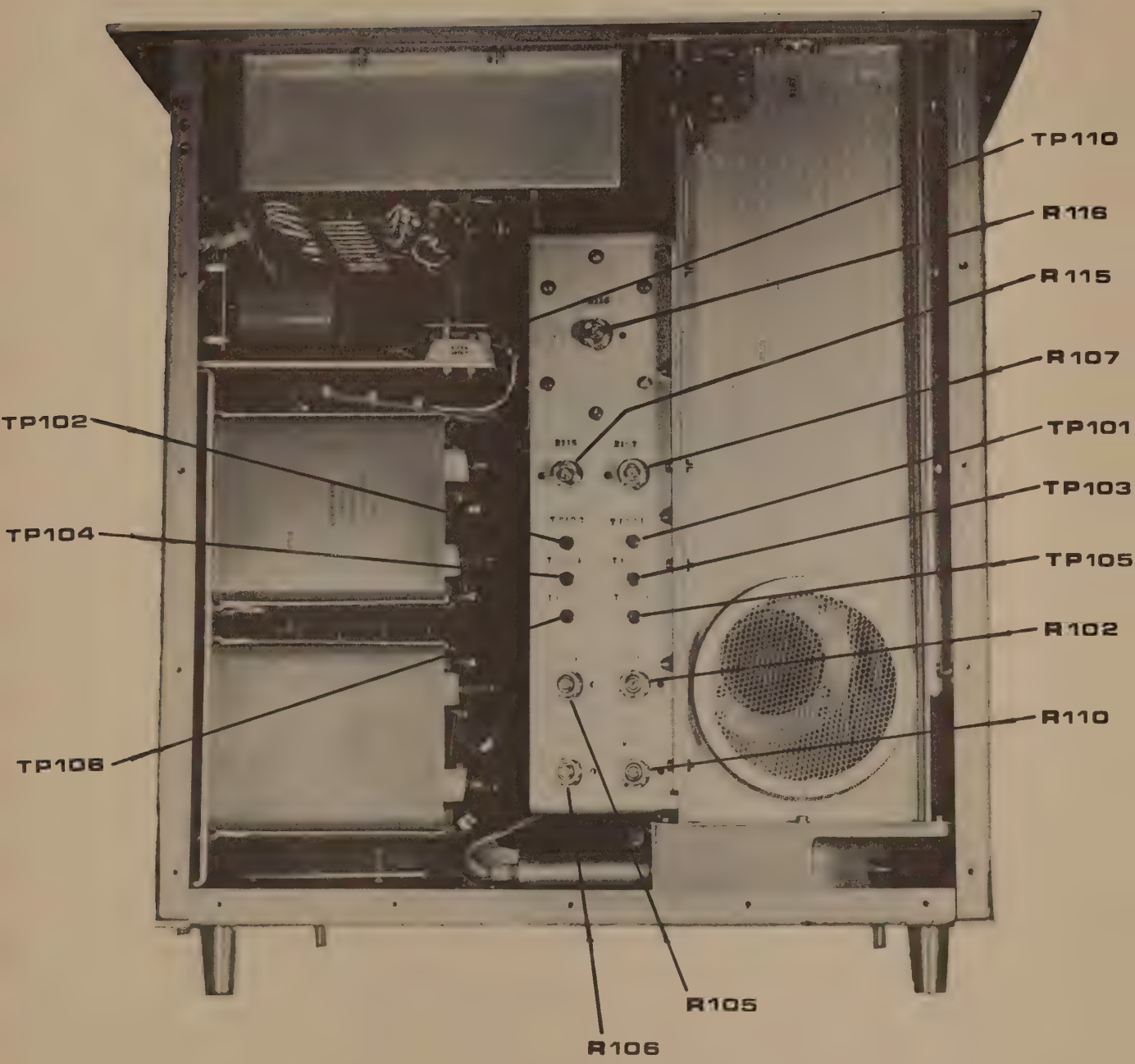

TP110
R116
R115
R107
TP102
TP101
TP103
TP104
TP105
R102
R110
TP106
R105
R106

FIGURE 7-12

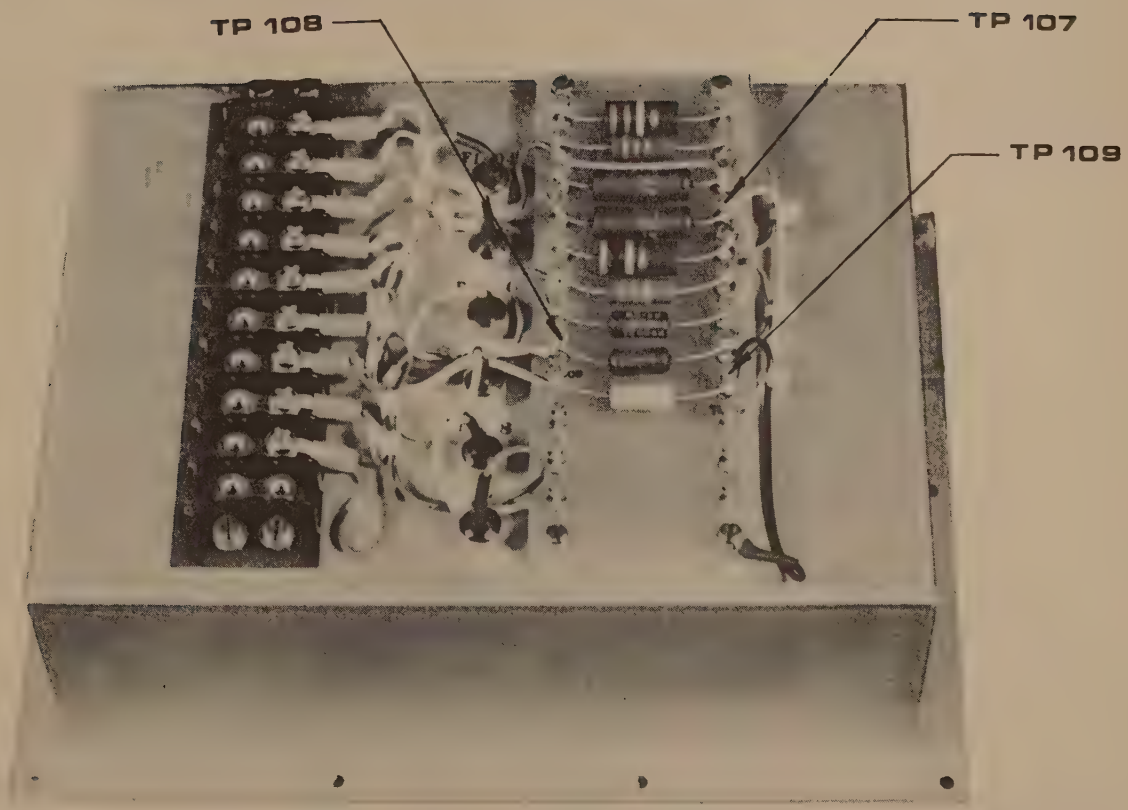


FIG. 7-13

1. Set the current meter switch to the "GRID" position.

2. Connect a short heavy jumper from TP108 to TP109 (See Figure 7-13).

3. Connect a variable power supply and standard ammeter in series with TP107 and TP108 (See Figure 7-13).

4. Vary the power supply for a calibration current of 50MA.

5. Check that the current indicated on the current meter indicates 50MA ± 2.0%.

7-25. SCREEN CURRENT METER

The calibration of the screen current meter of the Model 10358 R.F. Power Amplifier is made in the "POWER OFF" mode as indicated in paragraph 7-21. The following procedure should be followed (Refer to Figures 7-12 and 7-13).

1. Set the current meter switch to the "+ SCREEN" or "- SCREEN" position

2. Connect a short heavy jumper from TP107 to TP109 (See Figure 7-13).

3. Connect a variable power supply and standard ammeter to TP104 and TP109 (See Figure 7-13).

4. Vary the power supply for a calibration current of 25MA.

5. Check that the current indicated on the current meter indicates 25MA ± 2%.

6. Reverse power supply as required to indicate positive or negative 25MA.

7-26. VSWR CIRCUIT ADJUSTMENT

The VSWR circuit adjustment of the Model 10358 R.F. Power Amplifier is made in the "POWER ON" mode, therefore CAUTION should be exercised The following procedure should be followed.

1. Remove the top panel (Refer to Paragraph 7-11 and Figure 7-6).

2. Activate the high voltage interlock switch S106 located on the right side panel.

3. Set the equipment up as described in paragraph 6-5-2 "Mismatch Protection Short Circuit". (See Figure 6-2.)

4. Increase the output of the R.F. Power Generator from zero until the "RFL RF POWER" on the Model 10358 R.F. Power Amplifier indicates 20 watts.

5. Adjust R115 (Figure 7-12) so that K108 operates and cycles the Model 10358 R.F. Power Amplifier to the "FAULT" mode.

6. Monitor the input voltage to the VSWR circuit at TP110 (Figure 7-12) while adjusting R115. The voltage indicated should be approximately +0.4 to 0.5 volts DC.

7. It may be necessary to adjust R116 (Figure 7-12) to prevent relay chatter. A certain amount of interaction between R115 and R116 can be encountered requiring a resetting of both controls to obtain a positive action to the "FAULT" mode.

7-27. CATHODE BIAS ADJUSTMENT

The cathode bias adjustment of the Plug-in R.F. Modules associated with the Model 10358 R.F. Power Amplifier has initially been adjusted at the factory and should only require readjustment when tubes are replaced. The procedure listed below should be followed (The procedure is the same for all Plug-in Modules).

1. Set the current meter selector switch of the Model 10358 R.F. Power Amplifier to the "PLATE" position.

2. Turn the Model 10358 RF Power Amplifier on and switch to the "READY" mode.

3. Note the quiescent current indicated on the plate current meter - it should indicate as listed in the chart below. If current does not indicate properly, shut the unit off and readjust the resistors indicated until the proper level has been reached.

PLUG-IN MODULE	ADJUST RESISTOR	QUIESCENT CURRENT
10359	R301	50 - 60 MA
10363	R401	50 - 60 MA
10364	R501	50 - 60 MA
10365	R601	75 - 85 MA

The resistors indicated are mounted to the left rear on the base pan of all Plug-in Modules.

8.0 TROUBLE SHOOTING

8.1. Table 8-1 System Trouble Shooting has been prepared as a guide to aid in the isolation of possible problem areas that may arise.

(Table 8-1 Continued)

TABLE 8-1 MODEL 10358 RF POWER AMPLIFIER TROUBLE SHOOTING GUIDE

P	SYMPTON	PROBABLE CAUSE	REMEDY
	No "AC ON" light when CB101 is turned on	No AC Power Input	Check AC Source Check Power Cord and Connection to equipment
		"AC ON" indicator lamp is defective	Replace defective lamp
		Circuit breaker CB101 is defective	Replace CB101
		Line Filters FL101 & FL102 are defective	Replace FL101 & FL102
	No "STBY" light approx. 2 min. after "AC ON" is turned on	Air flow switch S108 is not operating	Check Air blower B101 for blocked air passage
		HV int. lock switch S106 not operating	Check tightness of top cover or if S106 is defective, replace
		Plug-in int. lock switch S107 not operating	Check pressure of lock screws on face plate of plug-in module to front panel of PS drawer or if S107 is defective, replace
		Time delay relay K101 not operating	Check for proper seating on socket or if found defective, replace
		"STBY" indicator lamp is defective	Replace
	No "Ready" light as "HV ON" switch S102 is activated and does not switch to "FAULT" condition	Switching relays K102 & K106 are not operating	Check if K102 & K106 are securely seated on sockets and also check for chattering action, if found defective, replace.

TABLE 8-1
CONTINUED

STEP	SYMPTOM	PROBABLE CAUSE	REMEDY
3 (cont)		Anode Power supply PS101 is not operating properly	Check test points TP101 and TP102 100VDC, for either one of these plug-in modules, 10359, 10363 and 10364 in the P.S. Drawer; 75VDC for plug-in Module 10365 in P.S. Drawer
		Failure of relay K105	Check for proper seating on socket and chattering action or if found defective, replace
		Defective "READY" lamp	Replace
4	No "READY" light as "HV ON" switch S102 is activated and switching instantaneously to "FAULT" condition	Over current at the Anode Power Supply PS101	Check output of PS101 for low resistance to ground or short.
		Over current at screen power supply PS102 (For all except 10365 plug-in module)	Check Pin 1A of P103 of plug-in module for short to ground.
			Check output of PS102 for low resistance to ground or short.
		Fault operation of VSWR sensor	Check RF drive and reflected Power output of Plug-in Module.

9.0 ELECTRICAL PARTS LIST

9.1. This section lists all the replaceable electronic components used in the Microwave Cavity Laboratories Model 10358 RF Power Amplifier (including Plug-in Modules). Table 9-1 lists the vendor codes from the Federal Cataloging Handbook, H4-2. Table 9-2 lists the Model 10358 RF Power Amplifier parts. Tables 9-3 through 9-10 list the parts for the Plug-in Modules, Power Supplies and Accessory Drawer. Tables 9-2A through 9-10A list the recommended spare parts for the Model 10358 R.F. Power Amplifier, Plug-in Modules, Power Supplies and Accessory Drawer. The tables contain the vendor code number in the "VENDOR" column of the tables to identify manufacturer whose part number appears there. Components that are commonly available commercially are marked "COM'L". The tables are arranged in alphabetical-numerical order by symbol number (which appears on the appropriate schematic drawing number).

9.2. An exact equivalent may be substituted for any part listed. Purchased parts may be obtained directly from the vendors, or they can be supplied by Microwave Cavity Laboratories upon receipt of an order specifying the Microwave Cavity Laboratories Model Number and symbol number for each part ordered. All parts should be ordered from:

MICROWAVE CAVITY LABORATORIES, INC.
10 North Beach Avenue
LaGrange, Illinois 60525

Phone: (312) 354-4350
TWX: 910-683-1899

TABLE 9-1 VENDOR CODES

CODE NO.	NAME AND ADDRESS
01121	Allen-Bradley Company - Milwaukee, Wisconsin
02660	Amphenol Corporation - Chicago, Illinois
04713	Motorola Incorporated - Phoenix, Arizona
05571	Sprague Electric Company - Los Angeles, California
15801	Fenwall Electronics Incorporated - Framingham, Mass.
16469	Microwave Cavity Laboratories, Inc. - LaGrange, Ill.
21427	Gagne Associates Incorporated - Binghampton, New York
44655	Ohmite Manufacturing Company - Skokie, Illinois
70903	Belden Manufacturing Company - Chicago, Illinois
73899	J.F.D. Electronics Company - Brooklyn, New York
76493	J.W. Miller Company - Los Angeles, California
80694	Forrest Electric Company - Melrose Park, Illinois
91637	Dale Electronics Incorporated - Columbus, Nebrasks
12697	Clarostat Manufacturing Company Incorporated - Dover, New Hampshire
25243	Cornell-Dubilier Electronics - Newark, New Jersey
83701	Electronic Devices Incorporated - Yonkers, New York
72928	Erie Technological Products Incorporated - Erie, Pensylvania
91929	Micro Switch - Freeport, Illinois
07886	National Radio Company - Melrose, Massachusetts
49617	Radio Corporation of America - Lancaster, Pennsylvania
00853	Sangamo Electric Company - Pickens, Sourh Carolina
13047	Maury Microwave Corporation - Montclair, California
93459	Weinschell Engineering Company - Gaithersburg, Maryland
99899	Narda Microwave Corporation - Plainview, New York
11882	Telonic Industries Incorporated - Laguna Beach, Calif.
94668	Sierra Electronic Operation - Menlo Park, California
88204	Sylvania Electric Products Incorporated, Ipswitch, Massachusetts
34553	Amperex Corporation - Hauppauge, New York
11961	Semicon Incorporated - Bedford, Massachusetts
13327	Solitron Devices Incorporated - Tappan, New York
16758	Delco Radio - Kokomo, Indiana
03508	General Electric Corporation - Syracuse, New York
07263	Fairchild Semiconductor Division - Mountainview, Calif.
07716	IRC Division of TRW Incorporated - Burlington, Iowa
28363	Corning Glass Technical Products Division - Corning, New York
30800	General Instrument Corporation, Capacitor Division - Tazewell, Virginia
71590	Centralab - Milwaukee, Wisconsin

TABLE 9-2 MODEL 10358 PARTS LIST
SCHEMATIC DIAGRAM 32D1223

SYMBOL	DESCRIPTION	PART NO.	VENDOR
B101	Blower	30C1591	16469
C101	Capacitor - 4MFD, 370VAC	0V30-40	05571
C102	Capacitor - .01MFD, 1KV	DD-103	COM'L
C103	Capacitor - .001MFD, 1KV	DD-102	COM'L
C104	Capacitor - 100MFD, 150V	TVA-1420	COM'L
C105	Capacitor - 5MMFD, 1KV	DD-050	COM'L
CB101	Circuit Brkr. - 15A, 115VAC	30C1590	16469
CR101 & 102	Diode - 1N4005	1N4005	04713
CR103	Zener Diode - 1N4755	1N4755	04713
CR104	Zener Diode - 1N4747	1N4747	04713
DS101	Lamp Indicator	81	COM'L
DS102	Lamp Indicator	81	COM'L
DS103	Lamp Indicator	81	COM'L
DS104	Lamp Indicator	81	COM'L
FL101 & FL102	Filter	30B1460	16469
FL104 - FL116	Filter	1202-052	72928[illegible]
FL117 - FL124	Filter	0D1	01121
FL125 - FL127	Filter	1202-052	16469
K101	Relay, Time Delay	22B1200	16469
K102	Relay	22B1201	16469
K103	Relay	22B1202	16469
K104	Relay	22B1203	16469
K105	Relay	22B1207	16469
K106	Relay	22B1206	16469
K107	Relay	22B1205	16469
K108	Relay	22B1210	16469
M101	Meter, RF Power	28B1115	16469
M102	Meter, Current	28B1116	16469
PS101	Power Supply, Anode	D10358-44	16469
PS102	Power Supply, Screen	30C1588	16469
PS103	Power Supply, Filament	30C1589	16469
Q101	Transistor - 2N2916	2N2916	04713
R101	Resistor - 220K - 2W	RC42GF	COM'L
R102	Potentiometer - 50 ohms - 2W	53C2	12697
R103	Resistor - 5.6 ohms - 1W	RC32GF	COM'L
R104 & R113	Resistor - 100 ohms - 2W	RC42GF	COM'L
R105	Potentiometer - 25K - 2W	53C2	12697

TABLE 9-2 CONTINUED
SCHEMATIC DIAGRAM 32D1223

SYMBOL	DESCRIPTION	PART NO.	VENDOR
R106 & R110	Potentiometer - 5K - 2W	53C2	12697
R107	Potentiometer - 500 ohms - 2W	53C2	12697
R108	Resistor - 100 ohms - 2W	RC32GF	COM'L
R109	Resistor - 5K-20W	HLA-20	91637
R111	Resistor - 510 ohms - 1W	RC32GF	COM'L
R112	Resistor - 200 ohms - 2W	RS2C	COM'L
R114	Resistor - 1K - 3W	995-3A	44655
R115	Potentiometer - 50K - 2W	53C2	12697
R116	Potentiometer - 2K - 2W	53C2	12697
R117	Resistor - 4.7K - ½W	RC20GF472K	COM'L
R118	Resistor - 2.2MEG. - ½W	RC20GF225K	COM'L
R119	Resistor - 2.2K - ½W	RC20GF222K	COM'L
R120	Resistor - 270K - ½W	RC20GF274K	COM'L
R121	Resistor - 10K - ½W	RC20GF103K	COM'L
R122	Resistor - 6.8K - ½W	RC20GF682K	COM'L
R123	Resistor - 120W - 1W	RC20GF104K	COM'L
R124	Resistor - 220 ohms - 2W	RC42GF	COM'L
R125	Resistor - 560 ohms - 2W	RC42GF	COM'L
S101	Switch, Momentary Contact	22B1208	16469
S102	Switch, Momentary Contact	22B1208	16469
S103	Switch, Momentary Contact	22B1208	16469
S104	Switch, Rotary Non-Shorting	A10358-39	16469
S105	Switch, Rotary Non-Shorting	A10358-38	16469
S106	Switch, Interlock	22AC2	91929
S107	Switch, Interlock	22AC2	91929
S108	Switch, Air Flow	SF2-3" Dia.-1/8"	21427
SG101	Spark Gap	30A1594	16469
T101	Transformer - 115VAC/95VAC	DC-85A	80694
T102	Transformer - 115VAC/24VAC	23C1151	16469

TABLE 9-2A MODEL 10358 RECOMMENDED SPARE PARTS LIST
SCHEMATIC DIAGRAM 3201223

SYMBOL	DESCRIPTION	PART NO.	VENDOR
DS101-DS104	Lamp, Indicator	81	COM'L
K101	Relay, Time Delay	22B1200	16469
S107-S108	Switch, Interlock	22AC2	91929
S108	Switch, Air Flow	SF-2-3" Dia.-1/8"	21427

TABLE 9-3 MODEL 10359 PARTS LIST
SCHEMATIC DIAGRAM 328I257

SYMBOL	DESCRIPTION	PART NO.	VENDOR
C301	Capacitor, *Special	A10359-11	16469
C302	Capacitor, *Special	B10359-79	16469
C303	Capacitor, *Special	2929-001	16469
C304	Capacitor, 100MMFD MICA	CM-15FD101JN3	25243
C305	Capacitor, *Special	A10363-6	16469
C306	Capacitor, 100MMFD MICA	CM-15FD101JN3	25243
C307	Capacitor, 20MMFD MICA	CM-15CD200JN3	25243
DC301	Directional Coupler - 10-50MHz	27C1147	16469
FL301	Filter	JN-17-255	05571
FL302-FL304	Filter	1202-052	318930
L301	Inductor, *Special	A10363-29	16469
L302	Inductor, *Special	A10359-45	16469
L303	Inductor, *Special	A10359-45	16469
L304	Inductor, *Special	B10359-86	16469
L305	Inductor, *Special	B10359-41	16469
R301	Resistor, 200 ohms - 25W	210-25	44655
R302	Resistor, 200 ohms - 25W	RH-25	91637
V301	Tube	B11029-699	16469
Z301	Cavity, 10-50MHz	10359	16469

TABLE 9-3A MODEL 10358 RECOMMENDED SPARE PARTS LIST
SCHEMATIC DIAGRAM 3281257

SYMBOL	DESCRIPTION	PART NO.	VENDOR
V301	Tube	B11029-699	16469

TABLE 9-4 MODEL 10363 PARTS LIST
SCHEMATIC DIAGRAM 328I258

SYMBOL	DESCRIPTION	PART NO.	VENDOR
C401	Capacitor, *Special	A10359-11	16469
C402	Capacitor, *Special	B10363-71	16469
C403	Capacitor, *Special	2929-001	16469
C404	Capacitor, 15MMFD - High Q	UY202	COM'L
C405	Capacitor, *Special	A10363-6	16469
C406	Capacitor, 51MMFD MICA	CM-15ED510JN3	25243
C407	Capacitor, 100MMFD MICA	CM-15FD101JN3	25243
C408	Capacitor, 200MMFD MICA	CM-15FD201JN3	25243
DC401	Directional Coupler 50-200MHz	27C1148	16469
FL401	Filter	JN-17-255	05571
FL402-FL404	Filter	1202-052	72928
L401	Inductor, *Special	A10363-91	16469
L402	Inductor, *Special	B10363-70	16469
L403	Inductor, *Special	A10363-52	16469
R401	Resistor, 200 ohms - 25W	210-25	44655
R402	Resistor, 200 ohms - 25W	RH-25	91637
V401	Tube	B11029-699	16469
Z401	Cavity, 50-200MHz	10363	16469

TABLE 9-4A MODEL 10363 RECOMMENDED SPARE PARTS LIST
SCHEMATIC DIAGRAM 3281258

SYMBOL	DESCRIPTION	PART NO.	VENDOR
V401	Tube	B11029-699	16469

TABLE 9-5 MODEL 10364 PARTS LIST
SCHEMATIC DIAGRAM 3281258

SYMBOL	DESCRIPTION	PART NO.	VENDOR
C501A & B	Capacitor, *Special	B10364-131	16469
C502	Capacitor, *Special	A10364-118	16469
C503A & B	Capacitor, *Special	A10364-51	16469
C504	Capacitor, *Special	A10364-61	16469
C506	Capacitor, *Special	B10364-32	16469
DC501	Directional Coupler, 200-500MHz	27C1149	16469
FL501	Filter	JN-17-255	05571
FL502-FL504	Filter	1202-054	72928
FL506	Filter	M404	00853
L501	Inductor	4584	76493
R501	Resistor, 400 ohms - 50W	0568C	44655
V501	Tube	B11029-699	16469
Z501	Cavity, 200-500MHz	10364	16469

TABLE 9-5A MODEL 10384 RECOMMENDED SPARE PARTS LIST
SCHEMATIC DIAGRAM 3281259

SYMBOL	DESCRIPTION	PART NO.	VENDOR
V501	Tube	B11029-699	16469

TABLE 9-6 MODEL 10365 PARTS LIST
SCHEMATIC DIAGRAM 32B1260

SYMBOL	DESCRIPTION	PART NO.	VENDOR
C601A & B	Capacitor, *Special	B10365-119	16469
C602	Capacitor, *Special	A10365-28	16469
C603	Capacitor, *Special	B10365-94	16469
DC601	Directional Coupler, 500-1000MHz	27C1177	16469
FL601	Filter	JN-17-255	05571
FL601-FL602	Filter	1202-052	72928
Q601	Transistor, 2N3773	2N3773	49617
Q602	Transistor, 2N5320	2N5320	49617
R601	Resistor, 200 ohms - 12W	210-12	44655
R602	Resistor, 68 ohms - ½W	RC42GF	COM'L
R603	Resistor, 1.2K - 1W	RC32GF	COM'L
R604	Resistor, 2.2 ohms - 1W	RC32GF	COM'L
R605	Resistor, 4.7 ohms - 1W	RC32GF	COM'L
RT601	Thermistor, KB22J1 (200 ohms)	KB22J1	15801
V601	Tube	27B1156	16469
Z601	Cavity, 500-1000MHz	10365	16469

TABLE 9-6A MODEL 10365 RECOMMENDED PARTS LIST
SCHEMATIC DIAGRAM 32B1260

SYMBOL	DESCRIPTION	PART NO.	VENDOR
V601	Tube	27B1156	16469

TABLE 9-7 MODEL 10358-44 PARTS LIST
SCHEMATIC DIAGRAM 32B124

SYMBOL	DESCRIPTION	PART NO.	VENDOR
C201 & C202	Capacitor, 4MFD - 4KVDC	30A1595	16469
CR201 - CR204	Diode, EH-400	EH-400	83701
L201 - L202	Inductor - 15-23HY	23B1139	16469
R201 - R202	Resistor, 10 ohms - 2W	RC42GF100K	COM'L
R203 - R212	Resistor, 5600 ohms - 11W	995-10A	44655
R213 - R217	Resistor, 43K - 11W	995-10A	44655
R218	Resistor, 50 ohms - 11W	995-10A	44655
SG201	Spark Gap	30A1594	16469
T201	Transformer, High Voltage	23B1138	16469

TABLE 9-7A MODEL 10358-44 RECOMMENDED SPARE PARTS LIST SCHEMATIC DIAGRAM 32B1243

SYMBOL	DESCRIPTION	PART NO.	VENDOR
CR201-CR204	Diode, EH400	EH400	83701
SG-201	Spark Gap	30A1594	16469

TABLE 9-8 MODEL 10366 PARTS LIST
DRAWING DIAGRAM 38A1113

SYMBOL	DESCRIPTION	PART NO.	VENDOR
1	Adapter Set	8801K	13047
2	Attenuator	50-20	93459
5	Coupler, Directional Coaxial	3000-30	99899
6	Coupler, Directional Coaxial	3000-40	99899
7	Coupler, Directional Coaxial	3002-30	99899
8	Coupler, Directional Coaxial	3002-40	99899
9	Low Pass Filter	TLC20-3EF1	11882
10	Low Pass Filter	TLC30-4EF7	11882
11	Low Pass Filter	TLC75-6EF1	11882
12	Low Pass Filter	TLC125-6EF1	11882
13	Low Pass Filter	TLC316-6EF1	11882
14	Low Pass Filter	TLC700-6EF1	11882
15	Low Pass Filter	TLS1225-5EF1	11882
16	Termination	160-50D	72928
18	Tube Puller	B10361-3	16469

TABLE 9-8A MODEL 10366 RECOMMENDED SPARE PARTS LIST
DRAWING DIAGRAM 36A1113

SYMBOL	DESCRIPTION	PART NO.	VENDOR
1	Adapter Set	8801K	13047
18	Tube Puller	B10361-3	16469

TABLE 9-9 MODEL 30C1589 PARTS LIST
SCHEMATIC DIAGRAM 32C1276

SYMBOL	DESCRIPTION	PART NO.	VENDOR
C1	Capacitor, 4000MFD/25V	982-543DF	30800
C2	Capacitor, 50MFD/50V	300D506G050EE4	05571
C3	Capacitor, 200MFD/12V	984-588G	30800
C4	Capacitor, .05MFD/75V	Z5U503	COM'L
C5	Capacitor, 2.5MFD/64V	C426ARH2.5	34553
C6	Capacitor, .69MFD/64V	C426ASH0.69	34553
CR1 to CR4	Diode, Rectifier, 100V-12A	1N1200A	13327
CR5 to CR8 and CR13	Diode, Rectifier, 200V-1A	S12	11961
CR9, CR11, and CR12	Diode, Zener, 5.1V-400MW	1N751A	04713
CR10	Diode, Zener, 15V-1W	1R15A	07716
Q1,Q11-Q13	Transistor, NPN	2N3055	13327
Q2, Q8	Transistor, NPN	2N3053	49617
Q3-Q7, Q10	Transistor, NPN	2N3394	03508
Q9	Transistor, PNP	2N3638	07263
R1, R17	Resistor, 1K-½W 10%	RC20GF102K	COM'L
R2	Resistor, 12K-½W 10%	RC20GF123K	COM'L
R3, R9, R23	Resistor, 3.3K - ½W 10%	RC20GF332K	COM'L
R4	Resistor, 22 ohms - ½W 10%	RC20GF220K	COM'L
R5	Resistor, 27 ohms - ½W 10%	RC20GF270K	COM'L
R6	Resistor, 1.0 ohms - 12W 5%	HL12-10G	91637
R7	Potentiometer, 500 ohms - 2W	BK64270	07716
R8	Resistor, 3.9K - ½W 10%	RC20GF392K	COM'L
R10	Resistor, 390 ohms - 3W 5%	RW69391	91637
R11	Resistor, 1.8K - ½W 10%	RC20GF182K	COM'L
R12	Resistor, 680 ohms - ½W 5%	RL20S681	28363
R13	Resistor, 150 ohms - ½W 5%	RL20S151	28363
R14	Resistor, 47 ohms - ½W 5%	RL20S470	28363
R15	Resistor, 1K - ½W 5%	RL20S102	28363
R16	Resistor, 1.2K - ½W 5%	RL20S122	28363
R18	Resistor, 470 ohms - ½W 5%	RL20S122	28363
R19	Resistor, 390 ohms - ½W 5%	RL20S397	28363
R21	Resistor, 2.2K = ½W 10%	RC20GF222K	COM'L
R22	Resistor, 330 ohms - 2W 10%	RC32GF331	COM'L
R24,R25,R26	Resistor, .27 ohms - 2W 10%	RC30GF275	COM'L
R36	Resistor, 47K - ½W 10%	RC20GF473K	COM'L
T1	Transformer	23C1159	16469

TABLE 9-9A MODEL 30C1589 RECOMMENDED SPARE PARTS LIST SCHEMATIC DIAGRAM 32C1276

SYMBOL	DESCRIPTION	PART NO.	VENDOR
CR1-CR4	Diodes, Rectifier	1N1200A	13327
CR5-CR8	Diodes, Rectifier	S12	11961
Q5	Transistor, NPN	2N3394	03508
Q11-Q13	Transistor, NPN	2N3055	13327
R6	Resistor, 1.0 ohms - 12W 5%	H612-10G	91637

TABLE 9-13 MODEL 3025SB PARTS LIST
SCHEMATIC DIAGRAM 32B1277

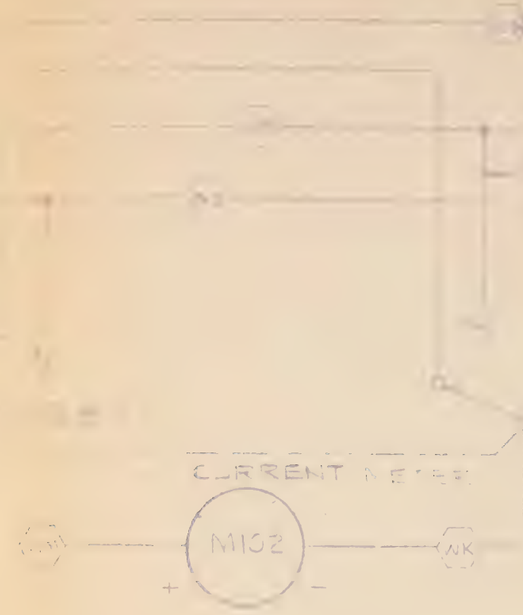
SYMBOL	DESCRIPTION	PART NO.	VENDOR
C1, C4	Capacitor, 50MFD/25V	C426ARF50	34553
C2	Capacitor, 50MFD/450V	36D-500F450AA	05571
C3	Capacitor, 20MFD/350V	BR-20-350	25243
C5	Capacitor, .005MFD/75V	Z5U502	71590
CR1	Diode, Rectifier, 200V - 1A	S12	11961
CR2-CR5	Diode, Rectifier, 600V - .75A	CER71	13327
CR6-CR9	Diode, Zener, 5.1V - 400MW	1N751A	04713
Q1	Transistor, NPN	DTS423	66001
Q2,Q4,Q5,Q6	Transistor, NPN	2N3394	03508
Q3	Transistor, NPN	2N3569	07263
R1, R16	Resistor, 470 ohms - ½W 10%	RC20GF471K	COM'L
R2	Resistor, 22 ohms - 2W 10%	RC32GF220	COM'L
R3	Resistor, 4.7K - ½W 10%	RC20GF472K	COM'L
R4,R11,R18,R19	Resistor, 7.5K - 3W 5%	RW69752	91637
R5	Resistor, 220K - ½W 10%	RC20GF224K	COM'L
R6	Potentiometer, 5K - 2W	BK67271	07716
R7	Resistor, 3.3K - ½W 5%	RL20S332	28363
R8	Resistor, 30K - 5W 5%	CW50033	91637
R9	Resistor, 8.2K - ½W 10%	RC20GF822K	COM'L
R10	Resistor, 68K - 1W 10%	RC32GF683K	COM'L
R12	Resistor, 390K - ½W 10%	RC20GF394K	COM'L
R13	Resistor, 2.2K - ½W 5%	RL205222	28313
R14	Potentiometer, 20K-1W	2387-203	91637
R15	Resistor, 1.5MEG - ½W 10%	RC20GF155K	COM'L
T1	Transformer	23C1158	16469

TABLE 9-10A MODEL 30C1588 RECOMMENDED SPARE PARTS LIST
SCHEMATIC DIAGRAM 3281277

SYSTEM	DESCRIPTION	PART NO.	VENDOR
CR1	Diode, Rectifier	S12	11961
CR2-CR5	Diode, Rectifier	CER71	13327
Q1	Transistor, NPN	DTS-423	66001
Q2	Transistor, NPN	2N3394	03508
Q3	Transistor, NPN	2N3569	07263

TABLE 9-11 MODEL 10358
ONE YEAR PROVISIONING LIST

MODEL NO.	SYMBOL	TABLE NO.	SPARES REQUIRED PER NO. UNITS INDICATED					TOTAL REQUIRED
			1	5	10	15	20	
10358	B101	9-2					1	1
	CB101	9-2				1		1
	DS101	9-2	4					76
	K101	9-2	1					19
	M101	9-2			1			2
	M102	9-2			1			2
	PS101	9-2					1	1
	PS102	9-2		1				4
	PS103	9-2		1				4
	S107	9-2	1					19
	S108	9-2		1				4
10359	V301	9-3	1					19
10363	V401	9-4	1					19
10364	V501	9-5	1					19
10365	Q601	9-6	1					19
	Q602	9-6	1					19
	RT601	9-6		1				4
	V601	9-6	1					19
10358-44	C201	9-7		1				4
	CR201	9-7	2					38
	L201	9-7			1			2
	SG201	9-7	1					19
10366	1	9-8	1					19
	18	9-8		1				4
30C1589	CR1	9-9	2					38
	CR5	9-9	2					38
	Q5	9-9	1					19
	Q11	9-9	1					19
	R6	9-9	1					19
30C1588	CR1	9-10	1					19
	CR2	9-10	2					38
	Q1	9-10	1					19
	Q2	9-10	1					19
	Q3	9-10	1					19


CURRENT METER
M102
NK
+
-

REVISIONS			
SYMBOL	DESCRIPTION	DATE	APPROVAL

PS 101
ANODE

PS 103
FILAMENT SUPPLY

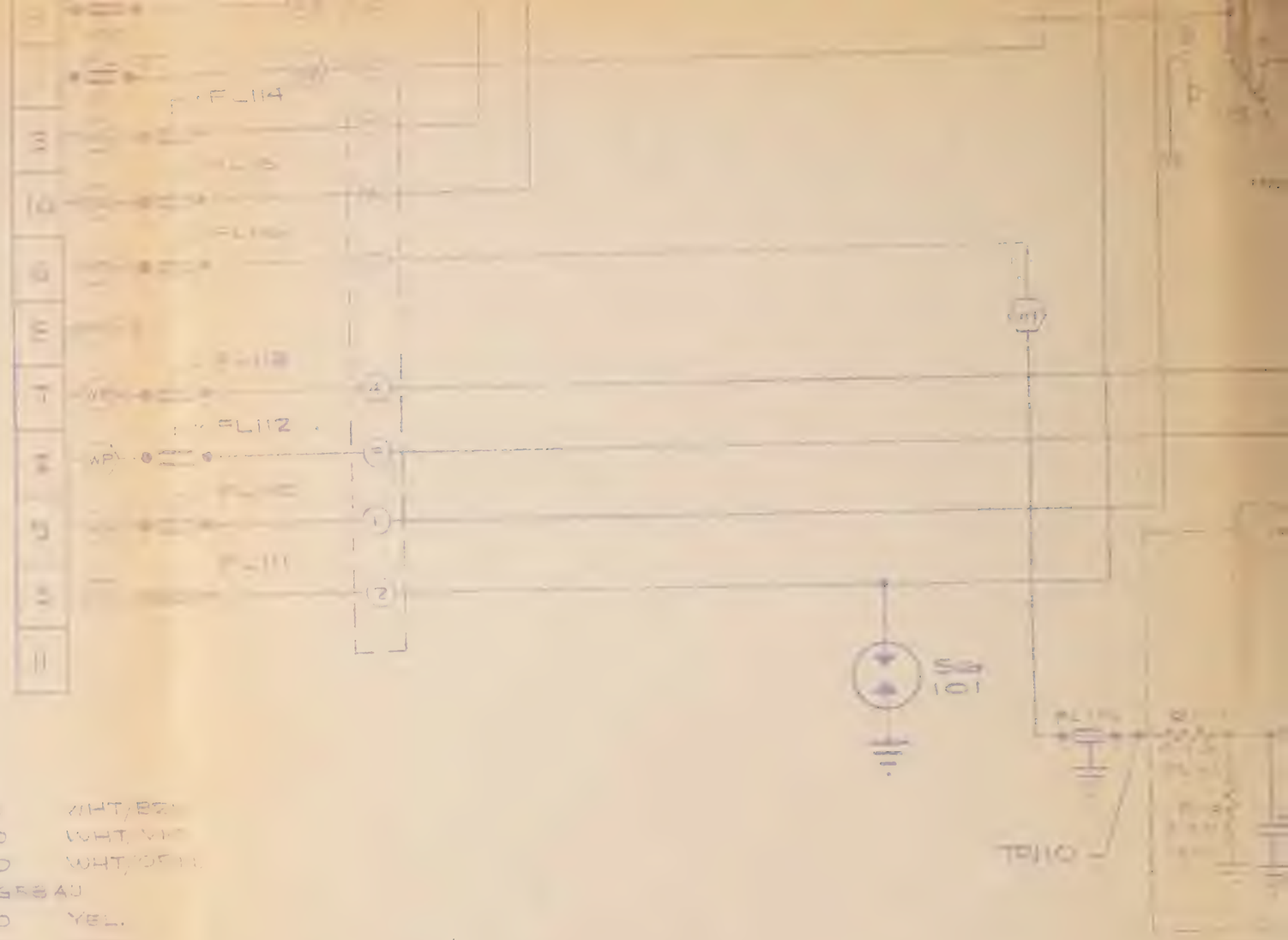
FOR SEPARATE
SCHEMATIC OF RF HD
SEE TAB -E BELOW

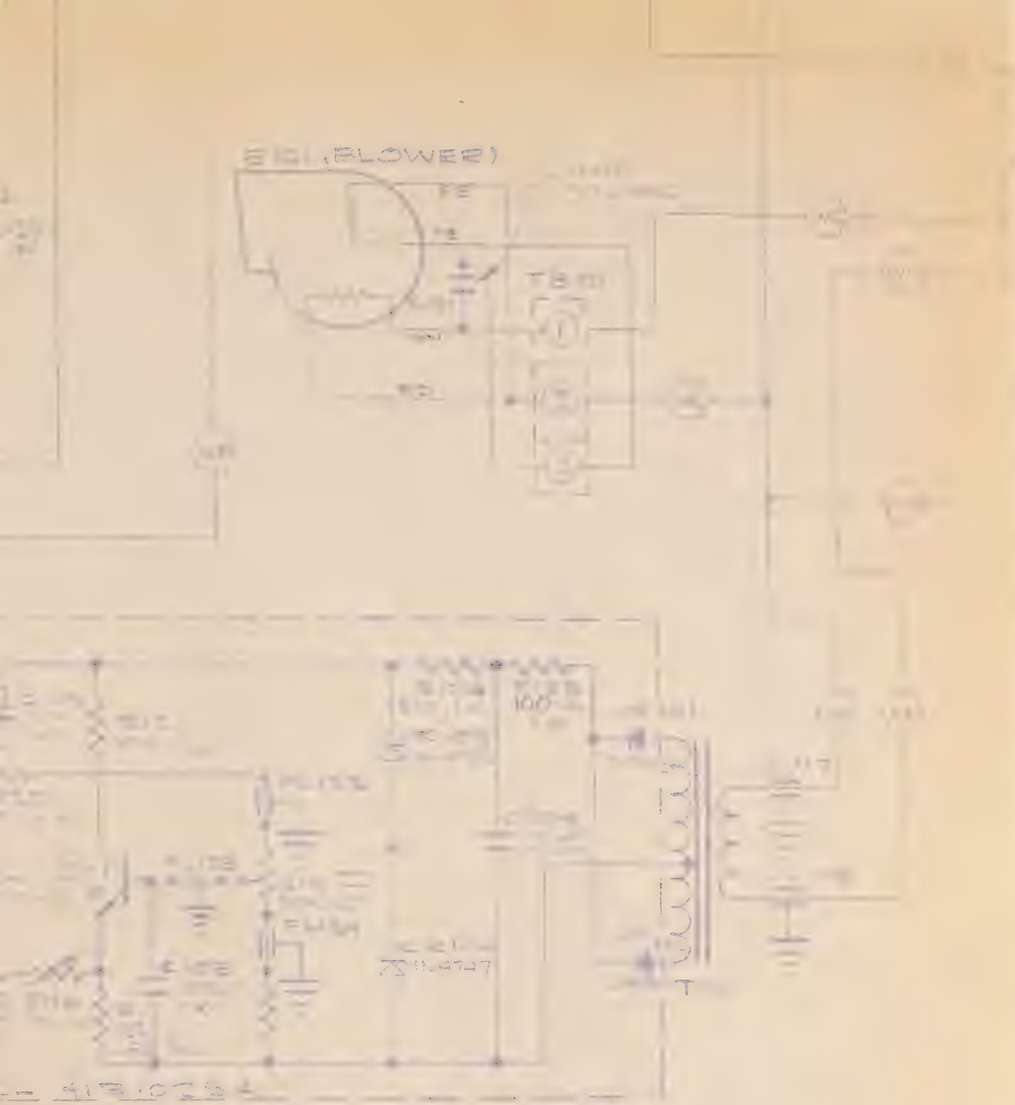
RF HD. NO	FREQ	SCHEMATIC
9589	[illegible]	[illegible]
10262	150-300 MHz	[illegible]
[illegible]	[illegible]	[illegible]
10225	[illegible]	[illegible]

WIRE CODE:

CODE	GA.	COLOR
[illegible]	[illegible]	GRAY
[illegible]	18	GRAY
[illegible]	[illegible]	GRAY
[illegible]	[illegible]	GRAY
WE	22	WHT/GRN.
[illegible]	[illegible]	WHT/RED
WG	22	WHT/YEL.
WH	22	WHT/BLU.
WI	22	WHT/VIO.
WJ	22	WHT/GRY.
WK	20	BLK.
WL	3KV	RED
WM	2A	RED
WN	[illegible]	[illegible]
WP	[illegible]	GRN.
WR	18	BRN

CODE	GA.	COLOR
WQ	18	WHT/BRN
WR	20	WHT/VIO
WS	20	WHT/GRY
WT	RG58AU	
WJ	20	YEL.
WV	16	BRN
WW	16	YEL




B1(BLOWER)
T1
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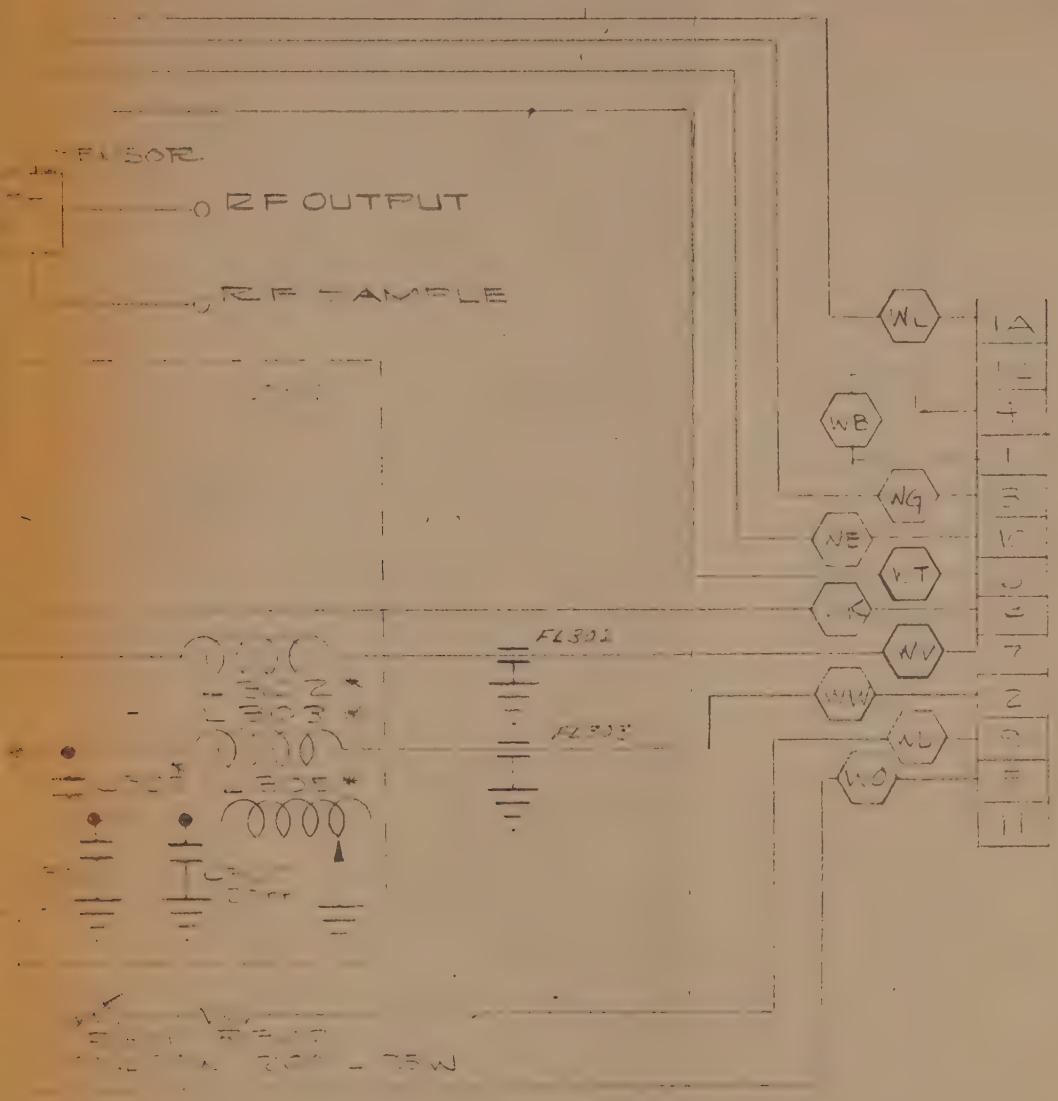
T40

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVA
[illegible]	[illegible]		[illegible]



ITEM	PART NO.	QTY.	DESCRIPTION	MAT'L.	MAT'L. SPEC

LIST OF MATERIAL

DRAWN	[illegible]	[illegible]
CHECKER		
MECH. ENGR.		
ELEC. ENGR.	[illegible]	[illegible]
PROJ. ENGR.		
CHIEF ENGR.		

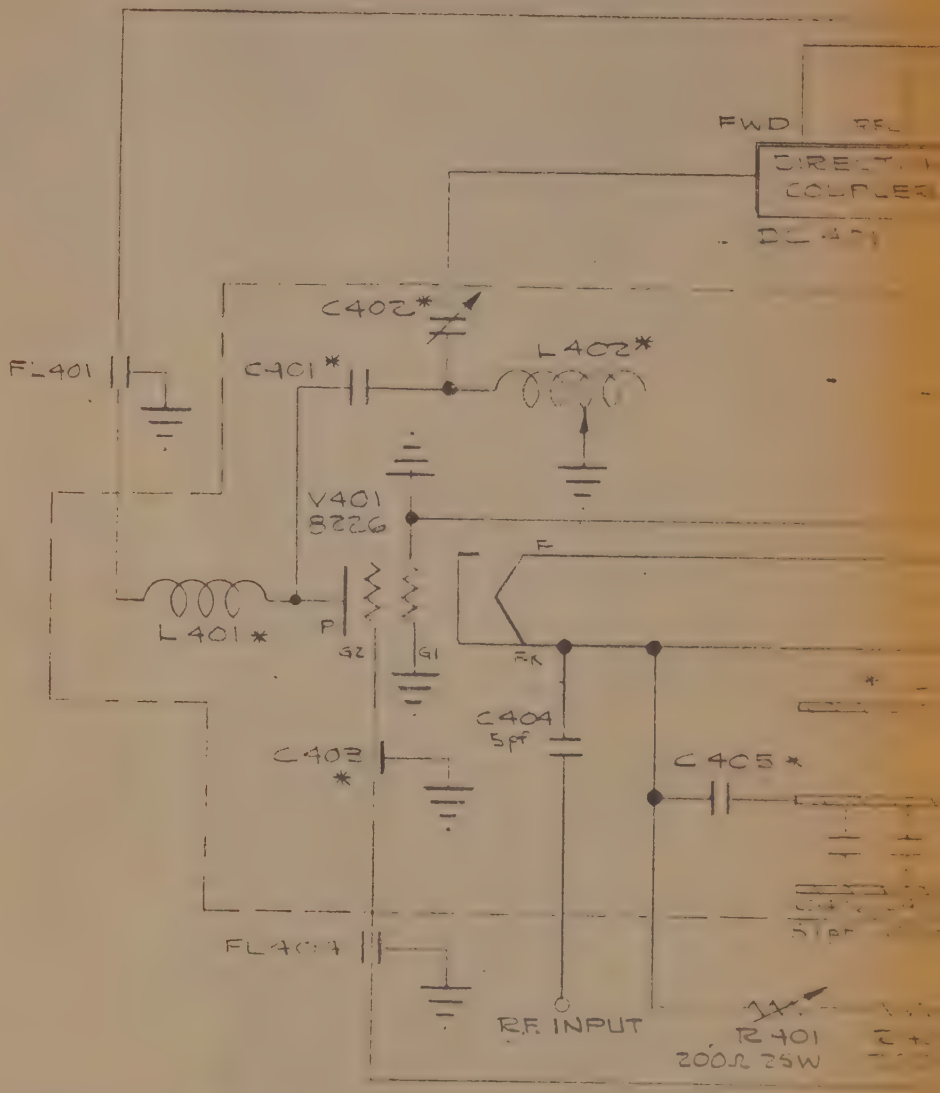
SCHEMATIC FOR
[illegible]-IN MODULE
10 MHz - 50 MHz
[illegible]

MCL MICROWAVE CAVITY LABORATORIES

MICROWAVE CAVIT
LABORATORIES
LaGRANGE, ILLINO

[illegible]

SCALE: WEIGHT ACT. CALC. SHEET OF



NOTES

DOTTED LINE INDICATES Z401

* INDICATES SPECIAL COMPONENTS

DO NOT SCALE:

UNLESS OTHERWISE SPEC

DIMENSIONS ARE IN INCHE

TOLERANCES FRACTIONAL
DECIMAL
ANGULAR

MATERIAL:

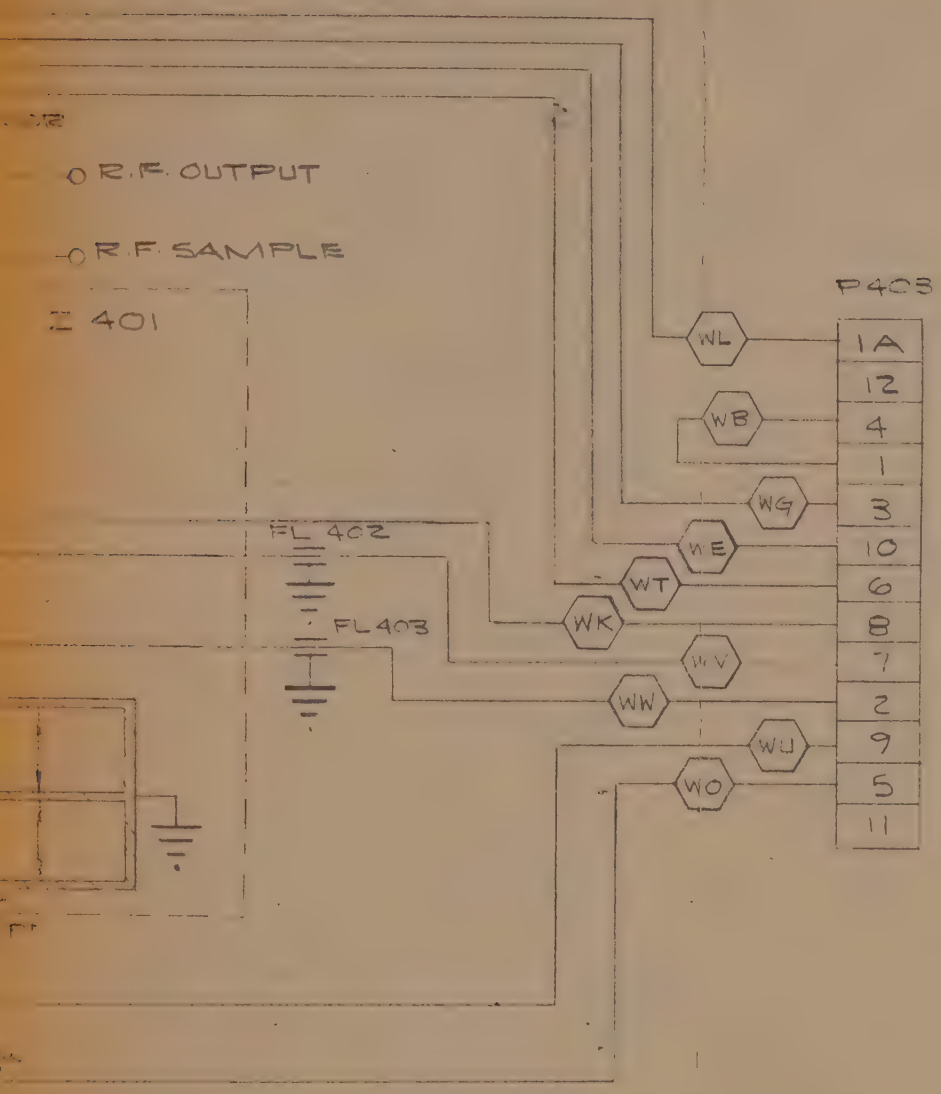
SPEC:

FINISH:

SPEC.

NEXT ASS'Y	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY. REQ'D.	

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVAL
B	REVISED & REDRAWN	[illegible]	[illegible]



ITEM	PART NO.	QTY.	DESCRIPTION	MAT'L.	MAT'L. SPEC.

LIST OF MATERIAL

DRAWN	[illegible]	7/27/70
CHECKER		
MECH. ENGR.		
ELEC. ENGR.		
PROJ. ENGR.		
CHIEF ENGR.		

SCHEMATIC FOR
PLUG-IN MODULE
150MHZ - 200MHZ
10363

MCL MICROWAVE CAVITY LABORATORIES

MICROWAVE CAVITY LABORATORIES
LAGRANGE, ILLINOIS

32B1238

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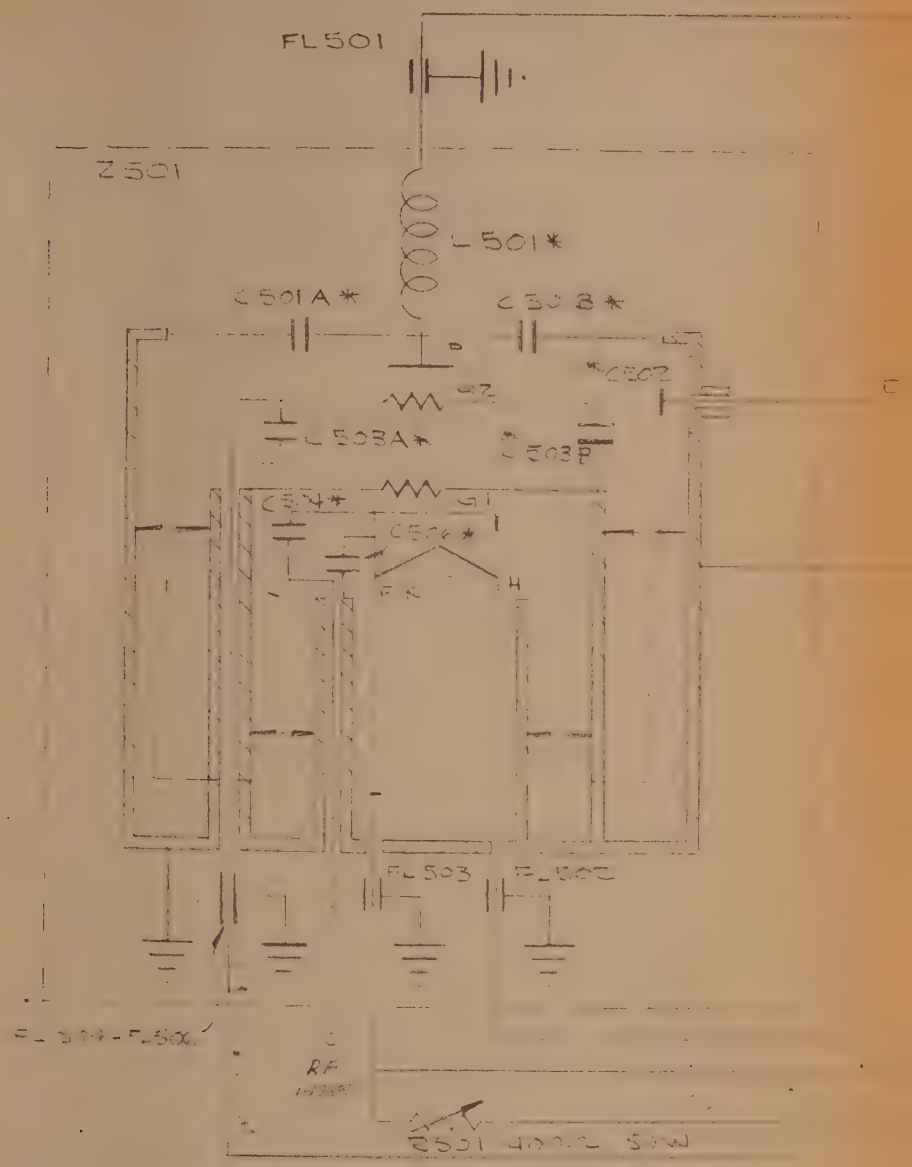


DO NOT SCALE:

UNLESS OTHERWISE SPEC

DIMENSIONS ARE IN INCHE
TOLERANCES FRACTIONAL
DECIMAL
ANGULAR

MATERIAL:

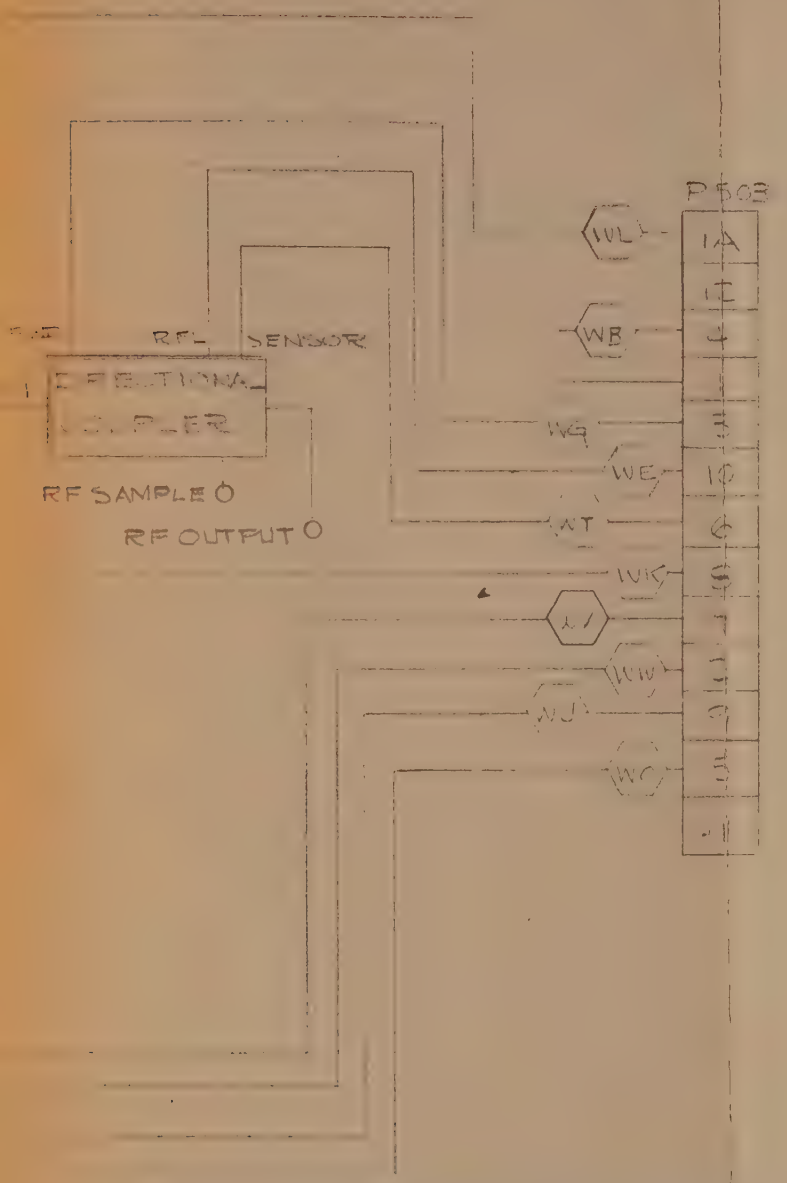
SPEC:

FINISH:

SPEC.

NEXT ASS'Y	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY. REQ'D.	

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVAL
B	REVISED & REDRAWN	[illegible]	[illegible]



ITEM	PART NO.	QTY.	DESCRIPTION	MAT'L.	MAT'L. SPEC.

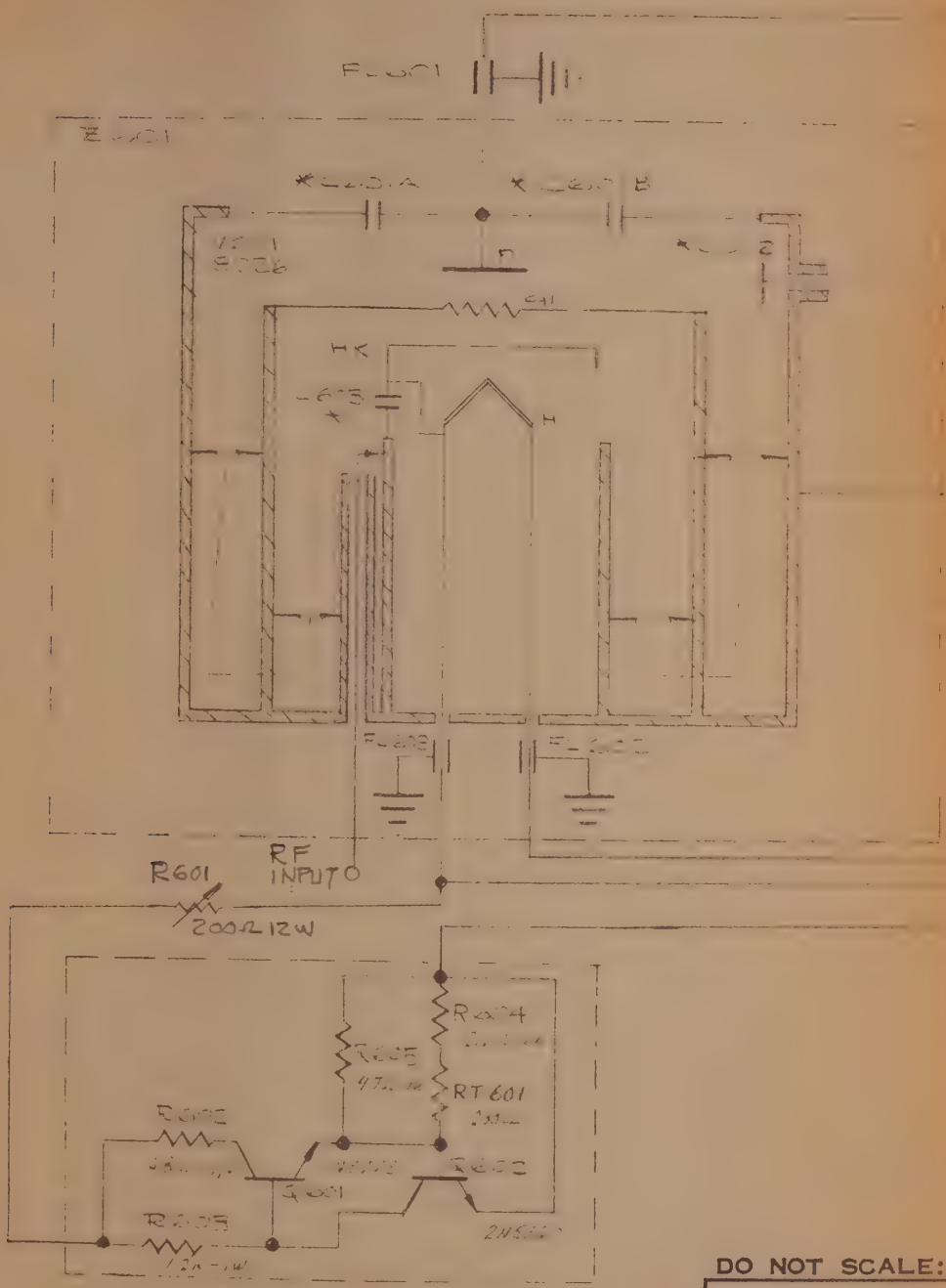
LIST OF MATERIAL

DRAWN			SCHEMATIC FOR [illegible]
CHECKER			
MECH. ENGR.			
ELEC. ENGR.			
PROJ. ENGR.			
CHIEF ENGR.			

MCL MICROWAVE CAVITY LABORATORIES

MICROWAVE CAVITY LABORATORIES
LAGRANGE, ILLINOIS

SCALE: WEIGHT ACT. CALC. SHEET OF



DO NOT SCALE:

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TOLERANCES FRACTIONAL
DECIMAL
ANGULAR

MATERIAL:

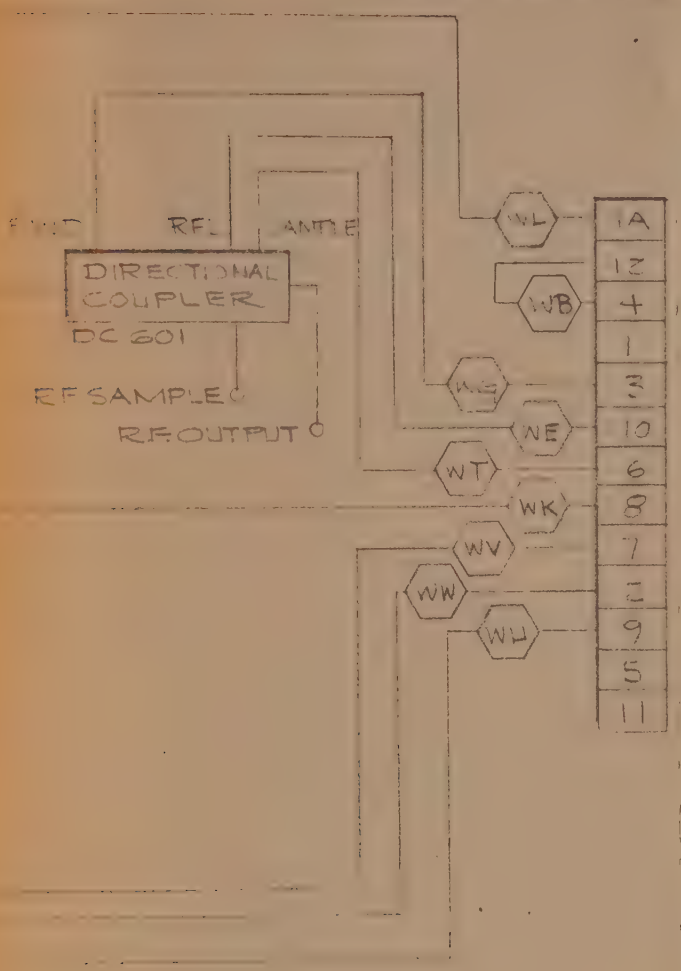
SPEC:

FINISH:

SPEC.

NEXT ASS'Y	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY. REQ'D.	

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVAL
B	REVISED & REDRAWN	1-23-70	



DOTTED LINE INDICATES Z 601
* INDICATES SPECIAL COMPONENTS

ITEM	PART NO.	QTY.	DESCRIPTION	MAT'L.	MAT'L. SPEC.

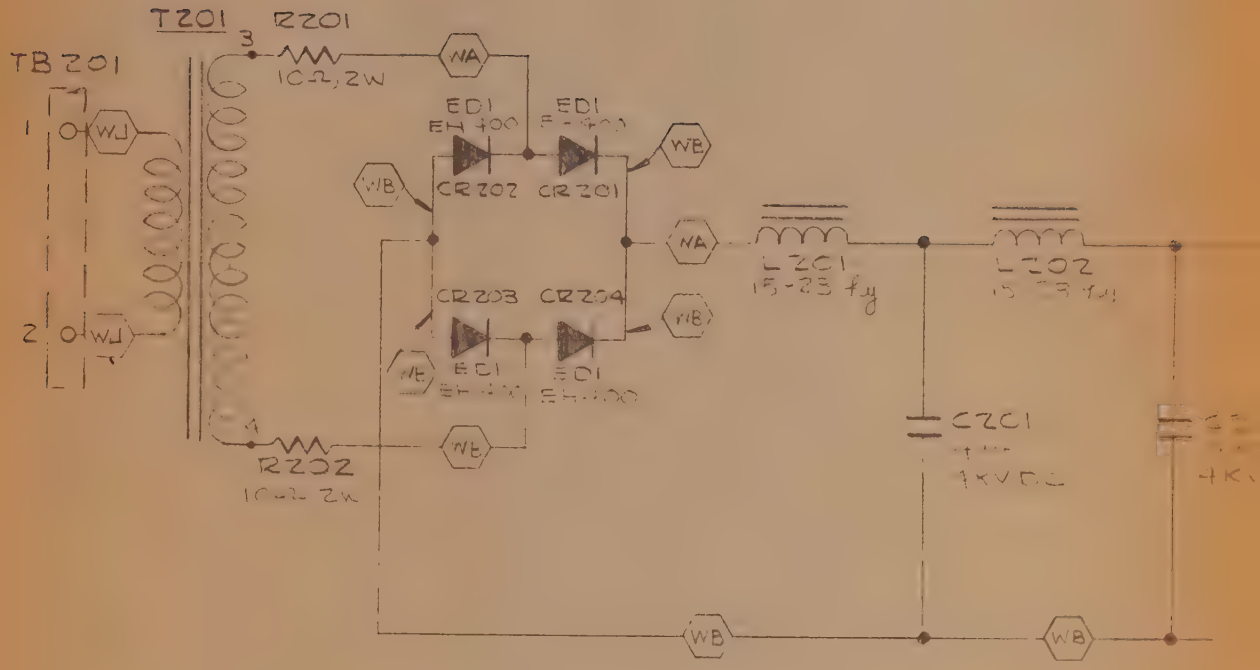
LIST OF MATERIAL

DRAWN		7-24-70	SCHEMATIC FOR PLUG-IN MODULE 500MHZ - 1000MHZ 1035
CHECKER			
MECH. ENGR.			
ELEC. ENGR.		1-28-70	
PROJ. ENGR.			
CHIEF ENGR.			

MCL MICROWAVE CAVITY LABORATORIES
MICROWAVE CAVITY LABORATORIES
LAGRANGE, ILLINOIS

32B 1260

SCALE: WEIGHT ACT. CALC. SHEET OF



WIRE CODE:

CODE	GA.	COLOR
WA	5KV	RED
WB	18	BLACK
WJ	18	WHT/GRAY

DO NOT SCALE:

UNLESS OTHERWISE SPECI

DIMENSIONS ARE IN INCHE

TOLERANCES FRACTIONAL
DECIMAL
ANGULAR

MATERIAL:

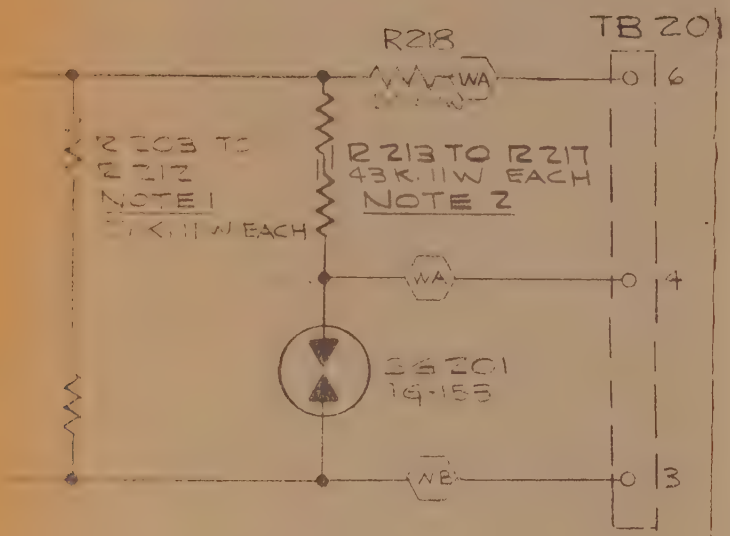
SPEC:

FINISH:

SPEC.

D10FB-44	10FB		
NEXT ASS'Y	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY. REQ'D.	

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVAL
A	ORIGINAL CG	1-18-69	
B	UPDATED RCT	2-17-70	
C	ADDED ELEC. VALUES	7-27-70	



NOTE:
1- STRING OF 10 RESISTORS
2- STRING OF 5 RESISTORS

ITEM	PART NO.	QTY.	DESCRIPTION	MAT'L.	MAT'L. SPEC.

LIST OF MATERIAL

DRAWN	C.S.	1-8-69	HIGH VOLTAGE POWER SUPPLY FOR D10358-44
CHECKER			
MECH. ENGR.			
ELEC. ENGR.			
PROJ. ENGR.			
CHIEF ENGR.			

MCL MICROWAVE
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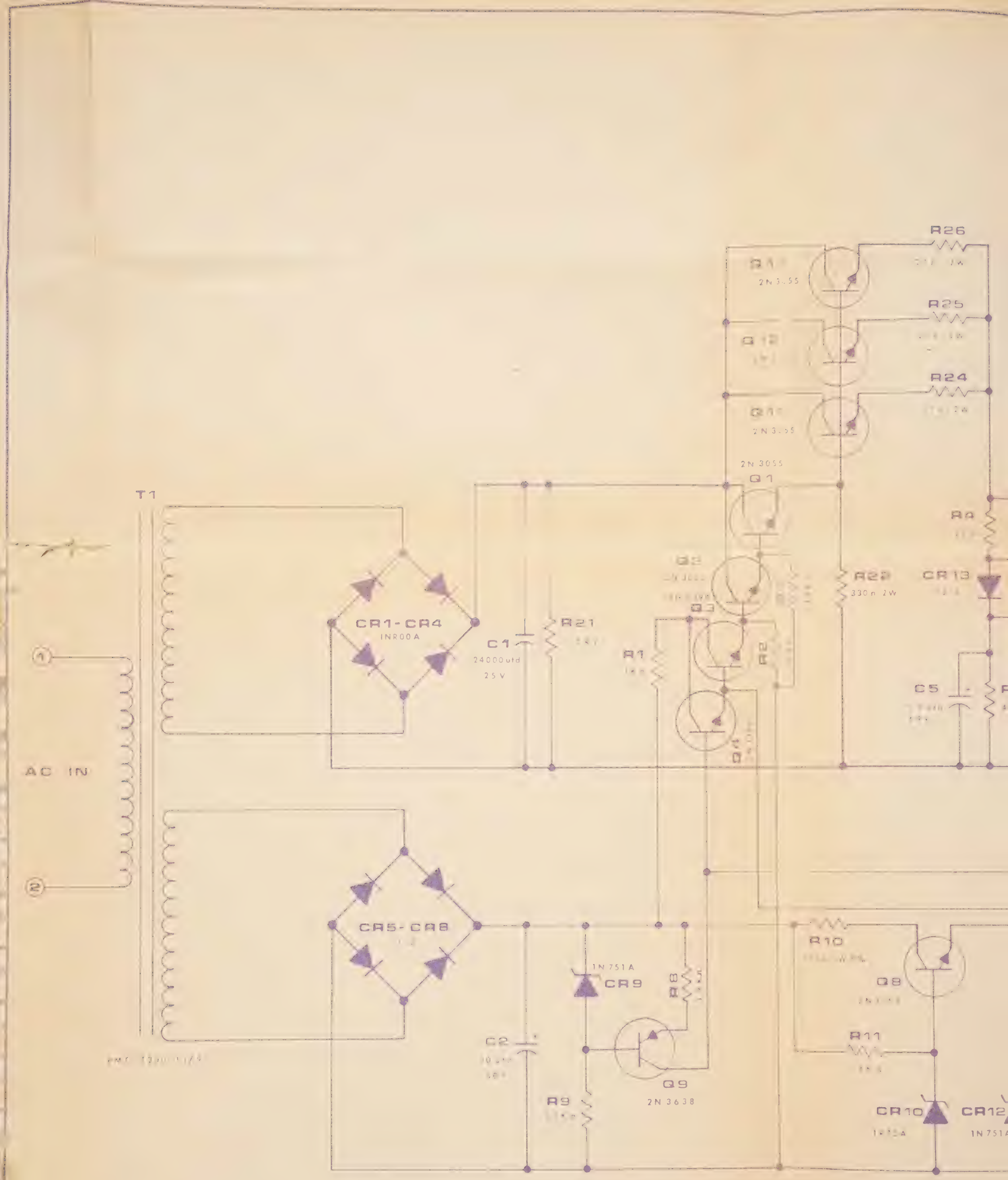
LAGRANGE, ILLINOIS

5281243

SCALE: ——— WEIGHT ACT. CALC. SHEET OF

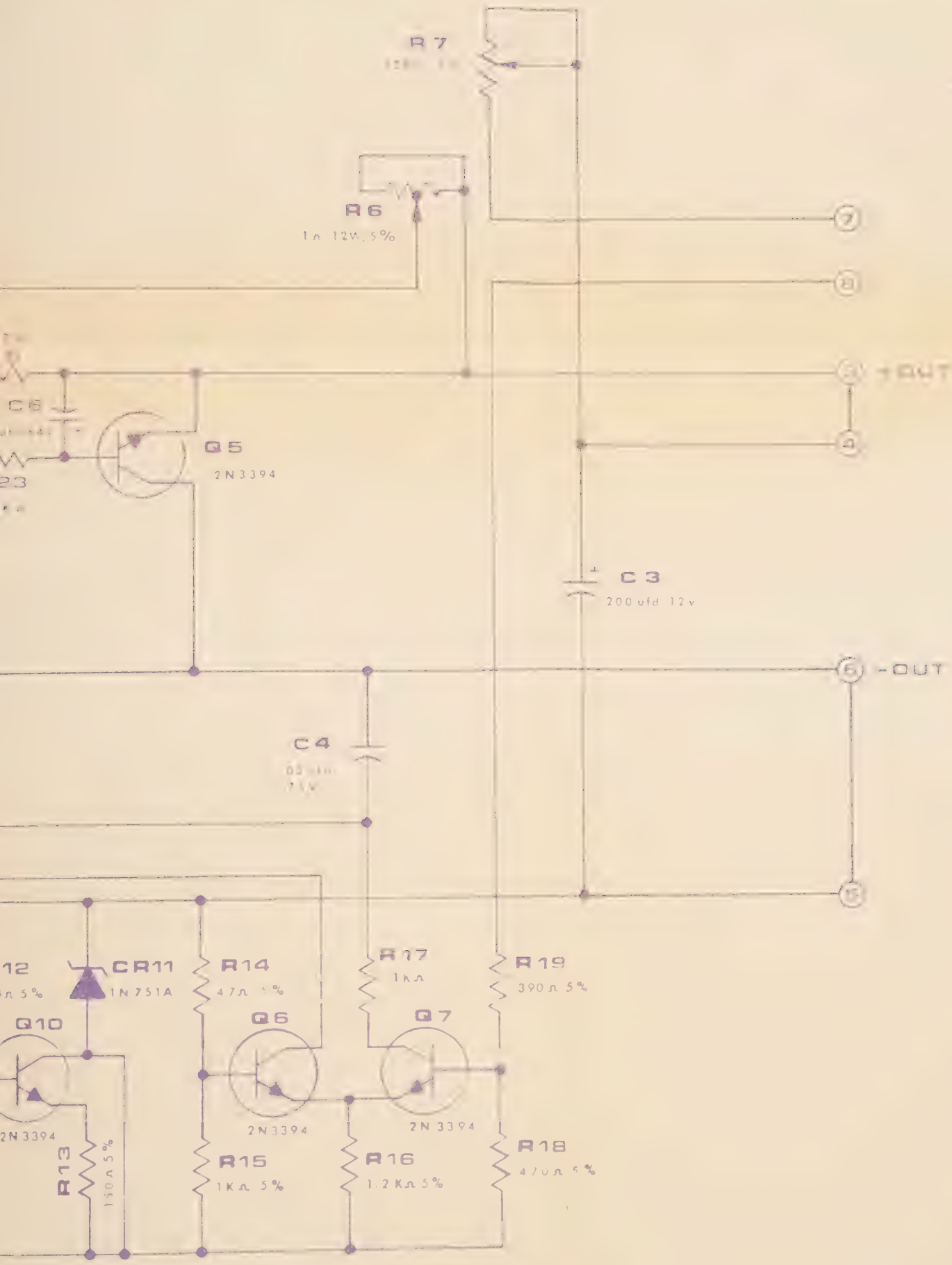


NOTE

ALL RESISTORS 1/2 W UNLESS OTHERWISE SPECIFIED

NEXT ASS'Y	USED ON	NEXT ASS'Y
APPLICATION		QTY

REVISIONS			
NO.	DESCRIPTION	DATE	APPROVED
1	ORIGINAL		



ITEM	PART NO.	QTY.	DESCRIPTION	MAT'L.	MAT'L. SPEC.
LIST OF MATERIAL					

DO NOT SCALE:

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES FRACTIONAL ± 1/64
DECIMAL ± .005
ANGULAR ± 1°

MATERIAL: _____ SPEC.

FINISH _____ SPEC.

DRAWN		
CHECKER		
MECH. ENGR.		
ELEC. ENGR.		
PROJ. ENGR.		
CHIEF ENGR.		

SCHEMATIC DIAGRAM FOR FILAMENT POWER SUPPLY

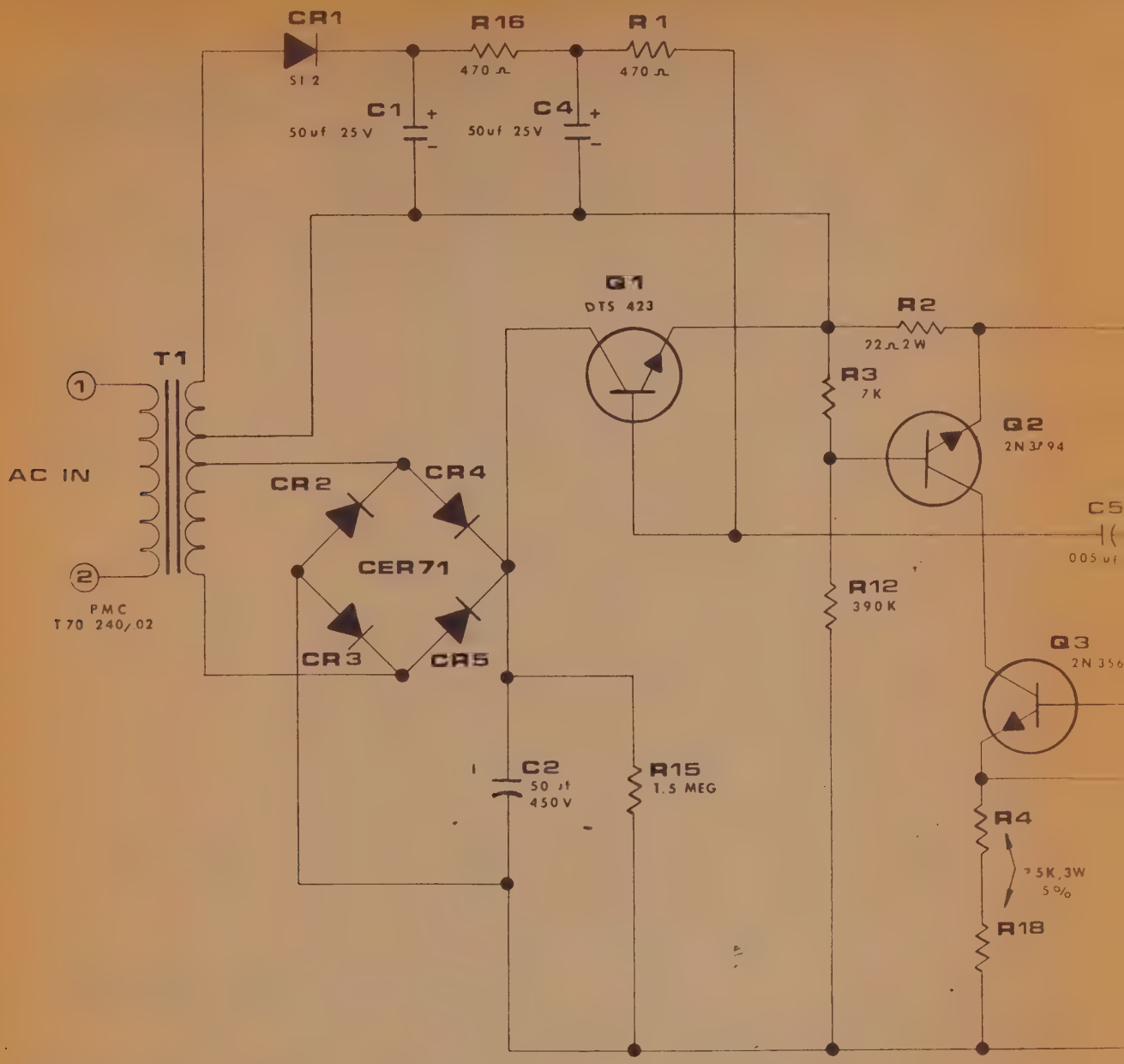
SCALE _____ WEIGHT ACT. CALC.

MCL M. ROWAN

MICROWAVE CAVITY LABORATORIES
LaGRANGE, ILLINOIS

32 C 1276

SHEET OF



NOTE

ALL RESISTORS 1/2 W UNLESS OTHERWISE SPECIFIED.

DO NOT SCALE:

UNLESS OTHERWISE SPEC

DIMENSIONS ARE IN INCH
TOLERANCES FRACTIONA
DECIMAL
ANGULAR

MATERIAL:

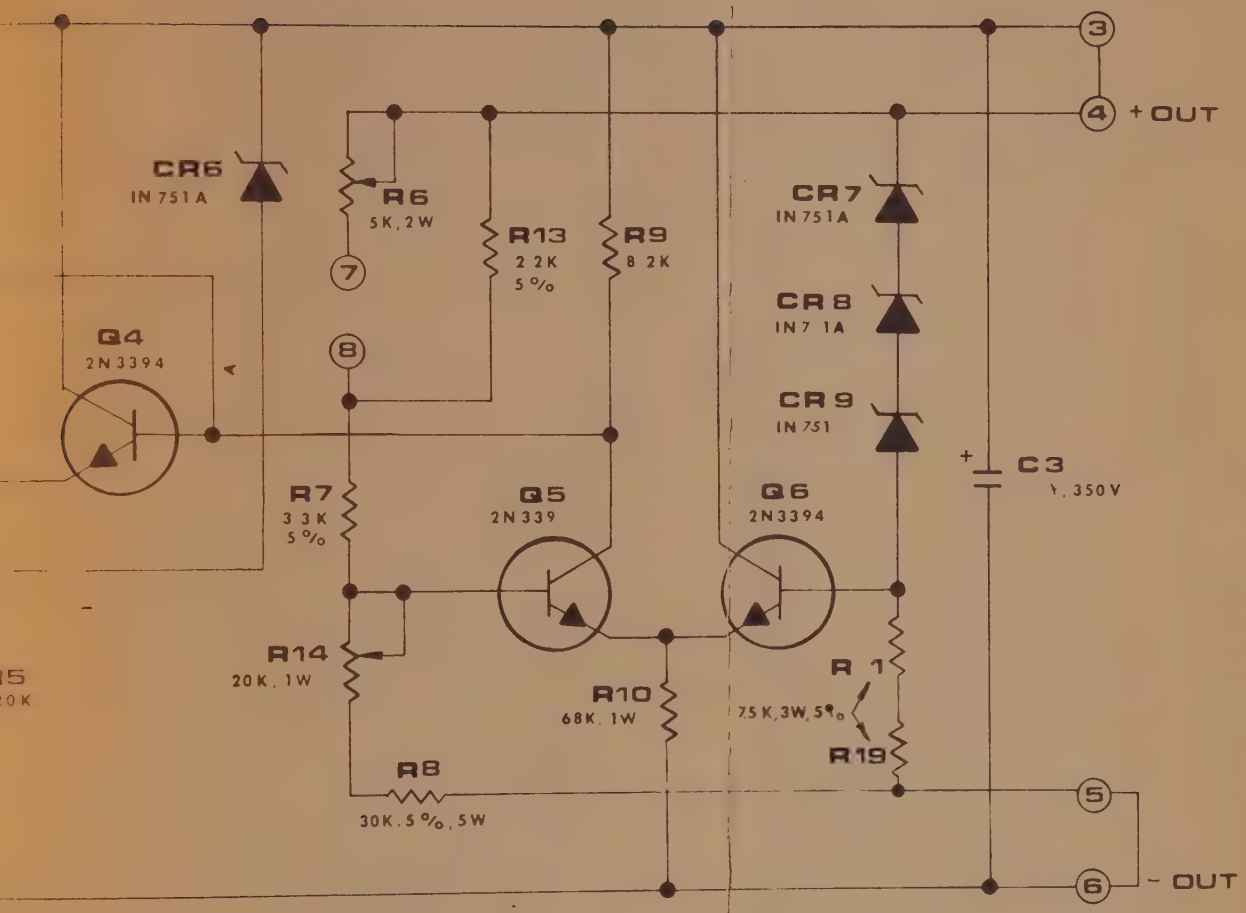
SPEC:

FINISH:

SPEC.

NEXT ASS'Y	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY. REQ'D.	

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVAL
A	ORIGINAL C.G.	12-11-70	



ITEM	PART NO.	QTY.	DESCRIPTION	MAT'L.	MAT'L. SPEC.

LIST OF MATERIAL

DRAWN	C.G.	12/11/70
CHECKER		
MECH. ENGR.		
ELEC. ENGR.		
PROJ. ENGR.		
CHIEF ENGR.		

SCHEMATIC DIAGRAM FOR SCREEN POWER SUPPLY

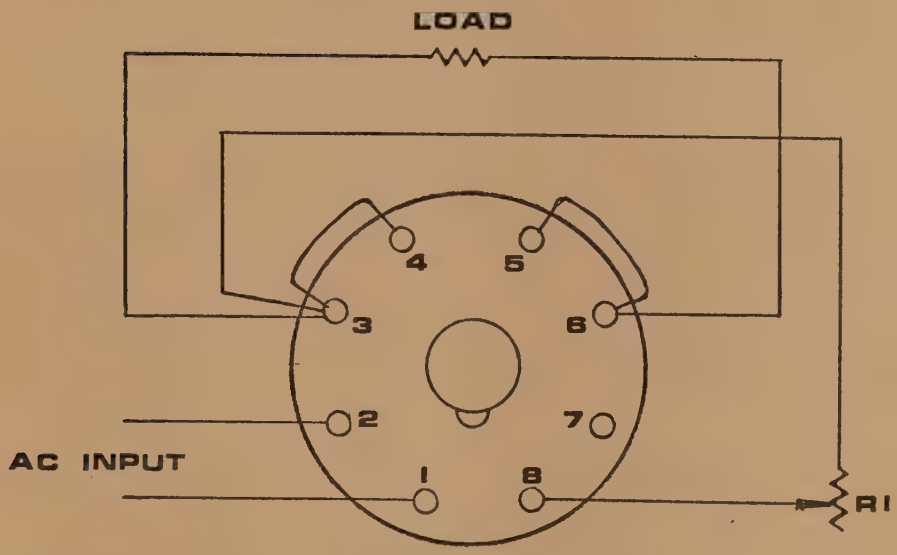
MCL MICROWAVE

MICROWAVE CAVITY LABORATORIES
LaGRANGE, ILLINOIS

32B1277

SCALE: | WEIGHT | ACT. CALC. | SHEET OF

TITLE		PREPARED BY	DATE
BASE STRAPPING DIAGRAM FOR FILAMENT AND SCREEN POWER SUPPLIES	MICROWAVE CAVITY LABORATORIES LAGRANGE, ILLINOIS	APPROVED BY	DATE
DATE OF ISSUE			



THE FOLLOWING PINS ARE INTERNALLY CONNECTED:
3 TO 4 AND 5 TO 6

FILAMENT SUPPLY - SCHEMATIC DIAGRAM 32C1276

SCREEN SUPPLY - SCHEMATIC DIAGRAM 32B1277

32A1275
SHEET 1 OF 1

TLE

MODEL 103.66 ACCESSORY DRAWER PARTS LAYOUT

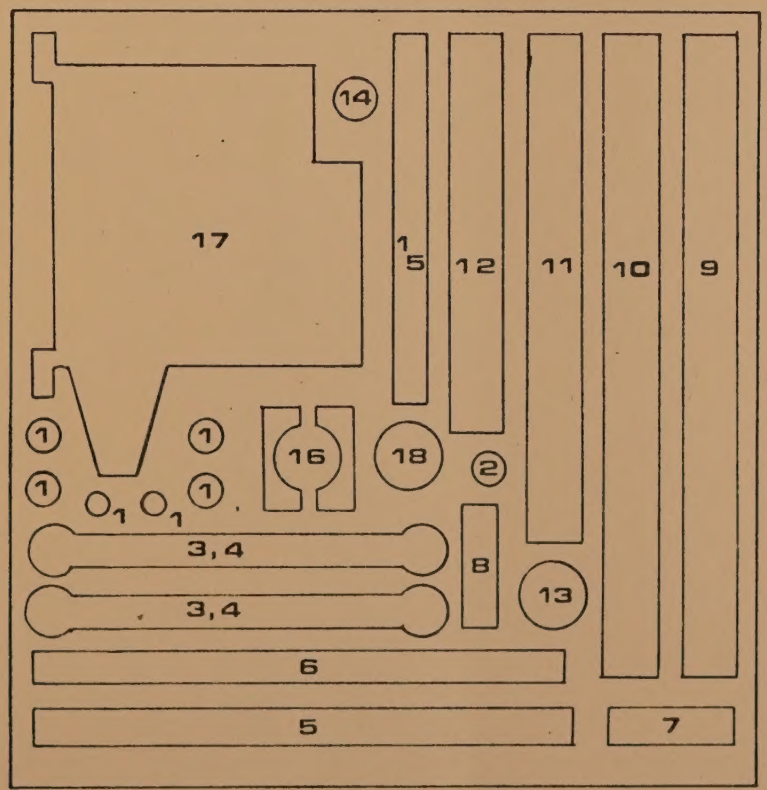
MICROWAVE CAVITY LABORATORIES
LAGRANGE, ILLINOIS

PREPARED BY DATE

APPROVED BY DATE

E OF ISSUE

ITEM NO:	COMPONENT	ARMY PART NO:	MANUFACTURERS PART NO:
1	ADAPTER SET		MAURY 8801K
2	ATTENUATOR		WEINSCHEL 50-20
3	CABLE ASSEMBLY	10519061	MCL 038 1062
4	CABLE ASSEMBLY	10519072	MCL 038 1063
5	COUPLER, DIRECTIONAL COAXIAL		NARDA 3000-30
6	COUPLER, DIRECTIONAL COAXIAL		NARDA 3000-40
7	COUPLER, DIRECTIONAL COAXIAL		NARDA 3002-30
8	COUPLER, DIRECTIONAL COAXIAL		NARDA 3002-40
9	LOW PASS FILTER		TELONIC TLC 20-3EF1
10	LOW PASS FILTER		TELONIC TLC 30-4EF7
11	LOW PASS FILTER		TELONIC TLC 75-6EF1
12	LOW PASS FILTER		TELONIC TLC 125-6EF1
13	LOW PASS FILTER		TELONIC TLC 316-6EF1
14	LOW PASS FILTER		TELONIC TLC 700-6EF1
15	LOW PASS FILTER		TELONIC TLS 1225-5EF1
16	TERMINATION		SIERRA 160-500
17	TERMINATION	10237502-2	SIERRA 160 B-300
18	TUBE PULLER		MCL B10361-3



38 A 1113

SHEET 1 OF 1

MICROWAVE CAVITY LABORATORIES
A DIVISION OF KMS INDUSTRIES INC.
10 N. Beach Avenue La Grange, Illinois 60525